MODEL AIRPLANE NEWS

July 1959—35 cents

IN THIS ISSUE

West Germany—'59

A Model Come Back

•

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Antique Engines, Radio Control

SAVE 50¢

HALF PINT OF
SUPERSONIC 100 or SUPERSONIC 1000
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...and you use the refillable bottle

AGAIN and AGAIN and AGAIN!

½ Pt. SUPERSONIC 100 . . .	50¢	½ Pt. SUPERSONIC 1000 . .	60¢
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. . . ***and how*** they'll fly! Comet's Ready-to-Fly "fleet" of high-impact plastic beauties out-flies, out-values and out-sells 'em all! We design 'em for maximum flyability, then choose the best engine for the job. Each complete with engine, starter, control handle and lines. In protective chests, printed in breathtaking full-color!

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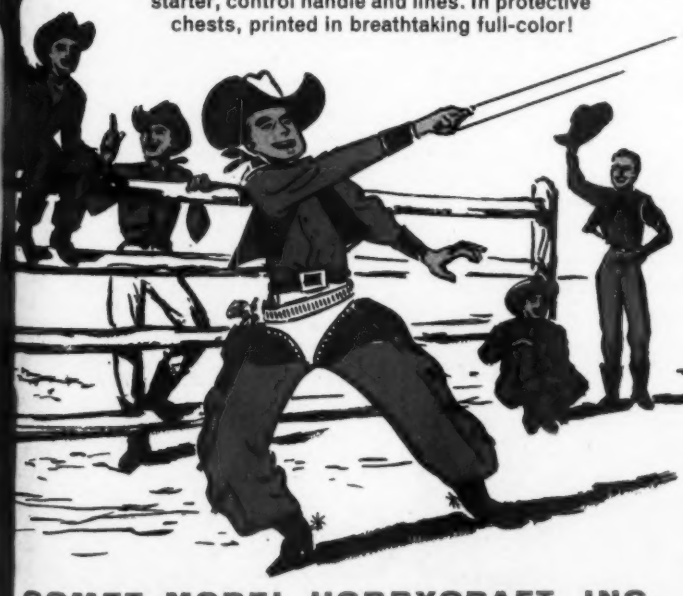

by COMET

Ready-to-run

11" long *Friction Clutch Drive*

PLR-3200 Belond AP Special Racing Car. .074 "OK" Cub Engine with pull starter, Bridle and Tetherlines. True-to-Scale replica of the car that won the 1957 and 1958 Indianapolis Speedway classics. In dazzling yellow plastic. Genuine rubber tires, decals and driver. **$11.95**

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You can now fuel your flying models easily and accurately...the "professional" way. Available only from PERFECT, a plunger type fuel pump and an all new bulb fueler with the exclusive features demanded by all model flying hobbyists. Both of these items • filter your fuel automatically • fit into any tank • measure fuel accurately • empty fuel cans completely • are easy to handle • are corrosion proof • and will give you years of trouble-free, dependable service. Get yours today from your favorite hobby dealer.

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ALL SIZES

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Foreign Notes

GREAT BRITAIN

Latest challenge to the supremacy of the Oliver Tiger diesel for FAI free-flight and team-racing is an entirely new British .15 cu. in. make, the Rivers "Silver-Streak."

Built by a firm new to model engine construction, but who have had experience of precision machining in the course of subcontract work for the aircraft industry, the Silver Streak follows the Oliver pattern insofar as it is a shaft-intake diesel with radial cylinder porting and has a certain similarity in general layout. It has, however, an appreciably lower stroke/bore ratio, slightly different transfer porting and a quite unique crankshaft and main bearing design.

The latter involves the use of roller bearing assemblies fore and aft of the intake port. This has allowed the use of a very large shaft diameter of .468 in. where the valve port is located, thus eliminating a weak point of most modern high-performance ball bearing equipped diesels. Actual bearing journals are turned down to .350 in. nominal diameter and contain seven .059 in. dia. rollers, separated by seven fully floating spacers.

The Rivers engine is clearly in the top performance group of .15 cu. in. motors and it will be interesting to see how it shapes up on the contest field. Price in the U.K. is £6.10s. ($18.20).

Also new on the British market is the PAW 149 Special diesel. By our test, we make this just about the most powerful 1.5 c.c. (.09 cu. in) motor to date, with a maximum output of .17 b.h.p. at 16,000 rpm. Engine is basically a scaled-down version of the PAW 249 Special, which is one of the hottest .15 cu. in. engines at present available. Both motors were designed by Gig Eifflaender, well-known stunt pilot and manufacturer of PAW Trucut props. Eifflaender plans to fly the little 149 in stunt contests this year against the big glow .35's.

GERMANY

Interesting new products announced by Graupner, Germany's largest model firm, include new R/C, new engines and new kits.

Most impressive item is a 10-channel, transistor receiver which is, quote, proportional with simultaneous control on three channels." Available July-August, receiver and transmitter will sell for about $220 in Germany. Graupner will also market servos to suit this equipment.

In single channel, Graupner is the first to follow the U.S. trend towards lighter, smaller, combination receiver units. The new Graupner Mikrokombi comprises an all-transistor receiver, rudder escapement and battery box, built as a self-contained unit and working from a single 6-volt battery. The escapement, rubber driven, has a built-in linkage to give direct push-pull actuation of the control surface. The receiver is for use with tone transmitters operating on a frequency of 27.12mc with 400 cycles modulation.

The Graupner Taifun Rasant .15 and Taifun Hobby .06 diesels are replaced by two new models carrying the same names. Both have the new streamlined crankcase design introduced last year on the Taifun

(*Continued on page* 58)

You're always "on frequency" with a CG transmitter-receiver combo

(New CG Venus Transmitter meets new FCC specs)

Here's an entirely new, single channel, extremely stable tone transmitter that'll stay right "on frequency" through every flight you make.

Known as the Venus, this new high powered version, modeled after the famous CG T-12 transmitter, is lightweight and a dream to operate. A high precision CG crystal keeps the Venus within 0.01% of specified operating frequency—well within new FCC specs.

And it's economical to run, too! "Balanced Power" design saves battery power—gets up to a year's use from "B" batteries.

Best of all, the Venus is economy priced at only $29.95. Get your order in early. Contact your local dealer or write direct to CG Electronics.

Venus is designed for any one of following FCC-allocated frequencies: 26.995 mc, 27.045 mc, 27.095 mc, 27.145 mc, 27.195 mc, and 27.255 mc. Please specify desired frequency with order.

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The Receiver Without Equal—The Well Known RT1-3V **$39.95**

- Size: 1½" x 2⅜" x 1"
- Weight: 2 oz. complete
- Power: 3 volts total
- Temperature Range: Guaranteed to operate between 0°F to 130°F
- Completely transistorized
- Factory pre-tuned

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- No electrical installation
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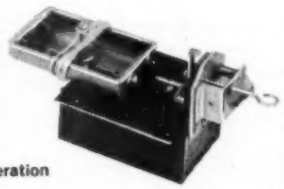
- Factory pre-tuned
- Guaranteed for 0°F to 130°F operation



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31st Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

July 1959 Vol. LXI, No. 1

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by William Winter

► When, in its August 1958 issue, MAN published the article, "How Safe Are Rockets?", papers were filled with cute items about junior rocketeers who mixed solid and chemical fuels, blasted off and blew up rockets in all corners and, if you'll pardon this freight-train sentence, it was a painful experience for any editor to dare to ask questions rather than climb on the powder-keg band wagon.

Writing in the April 1959 issue of Astronautics, George P. Sutton, immediate past president of the American Rocket Society, views with genuine alarm the developing situation. A test sample of 12,000 amateur rocketry experiments reveals 15 deaths in 1958, 1500 injured, of whom 350 were permanently crippled or disfigured.

While people usually think of explosions during launching, Sutton states the most dangerous operations of all probably are the filling of the rocket with solid fuel, some monopropellants; and all types of igniters. In fact, he mentions a friend who blew himself up assembling a rocket, and this man was one of the best chemists in the business, with years of experience with rockets. Nine other acquaintances, experts all, died in rocket fuel fires and explosions.

MAN can state that the attitude of many responsible agencies is that amateur rocketry experiments should not be stopped legally (referring to unqualified personnel, unsupervised kids, etc.,), if that is possible, because the experimenters would be driven underground. Perhaps such agencies should consider the case of 16-year-old Larry Burman who, having blown off his right hand, was reported by police to have said, "Why doesn't the government pass a law so kids like me can't buy this stuff? We only get ourselves into trouble."

• • •

► Having duly reported an overnight stay at Carroll Moon's Memory Inn, in Wappingers Falls, N.Y., and the intrepid ex-free flighter's plan to stage a get-together for valid members of the old Skyscrapers, have these comments, via "Moon," from a missionary in Manaus, Brazil.

"I picked up Model Airplane News," says this far-off friend (incidentally, have heard from ministers, priests, nuns, and evangelists, who read MAN), "and if you wonder why so late, it's because (*Continued on page* 62)

NEXT MONTH'S COVER Flying Tigers

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PLANE ON THE COVER

World famous home-built, George Meyer's Little Toot is a great favorite of the model builders. The splendid painting by cover artist Jo Ketula explains why the cute little bipe is a hit with airplane fans. Meyer is a long-time modeler and has made a miniature Little Toot for RC. Description of the real aircraft, pix, and drawings on page 28.

MORE "GIT UP 'N' SCAT"

OK CUB .074
Outstanding for Stunt or Speed
NOW ONLY $5.45
complete with fuel tank

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Powerful Class A Performer
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A GREATER THAN EVER VALUE. There's never been a model engine bargain to beat these. The same power, speed, performance and husky construction that made the .074 and .099 Cubs the favorites of thousands of modelers are wrapped up in these new, low prices.

Here are some of the exclusive features of all O.K. Cub Engines: special, bearing-quality, die cast crankcase; hardened, aircraft steel crankshaft; patented 360° porting; replaceable Glow Plug.

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*Cub	.049S	6.95
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Diesel		
Cub	.049	6.95
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*aircraft engine with recoil starter
**marine engine with recoil starter

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THUNDER BIRD 2.50 Another popular Scientific U-Control model. 15" wingspan balsa for ½A engine. Profab. Carved fuselage.

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Bonus items include: Ownership Decal. Gas Model Construction Manual. Correct Size Rubber Wheels. Insignias. Numeral & Alphabet Decals, etc. FREE of extra cost.

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AHC matches any offer made by any other advertiser. Attach ANY ad in this issue to your order — and take advantage of the AHC "extras."

ORDER NOW! Get all these AHC "EXTRAS"

RAT RACER $4.50 Guillow's U-Control model for Rat Race event. 24" span for .25 to .40 eng. Pract. indestructible.

WHIPSAW $1.98 Combat and stunt model from Enterprise Models. 21" span. For .09 to .19 engines. U-Control.

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FREE FLIGHT & R C

BLAZER ½A 2.50 C-G MODELS contest flyer for .049 engines. 40" Wingspan. A truly excellent performer. Order from AHC

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STINSON RELIANT $24.95 82½" span R/C old timer brought back by popular demand by Cleveland. For .19 to .60 engines. Luscomb Sedan 76" .19-.35 14.95

MODEL BOATS

Colonial Fisherman $24.95 We've heard nothing but "raves" about this famous 42" "IDEAL" R/C BOAT. Prefab with welded wood hull

Fitting Set $9.95

Why Order from any Manufacturer? We carry in stock all the planes, motors, etc. of every manufacturer advertising in this magazine.

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P-40 FLYING TIGER $10.00 Cox's terrific new Ready-to-Fly scale model. Full 20" wingspan. Powered with Super Bee engines.

With Recoil Starter $13.95

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AQUAMITE $10.95 Here's Wen Mac's extremely popular speedboat—ready to run and supremely easy to operate. 12" long. All plastic.

MISCELLANEOUS

FAMOUS MEGCO PLASTIC **SPINNERS**
Colors: Yel. Blk. Silv. Blue. Red. Grn.
1½" Diam. Needle Mount 25
1½", 1¾", 2" or 2½" Needlemount 35
1½", 1¾", 2" or 2¼" 2nd. 35

Accessory Kit OK Cub. For all cub engines. Has fuel tank, sponge, battery leads, plug wrench, etc.
1.25

U-REELY Our most popular control handle.
Std. Wire $7.95
Braided .012 ..... 8.95
Braided .018 ..... 8.95

MAGNESIUM SPEED PANS

	Top	Btm.	Cowl	Stab	Wing
½A	2.40	1.98			
A	2.95	2.98	2.50	.85	3.50
B	3.45	3.45	2.75	1.00	4.50
C	3.95	3.95	3.15	1.15	4.95

6.95 YELLOW JACKET Brand new WEN MAC gull wing ready to fly sensation. Big value outfit. Rotomatic starter. Real bargain!

7.95 SUPER CUB 105 Realistic, smooth flying COX model. Hi-impact plastic. Comes with Thimble Drome .049 engine. 17½" wingspan.

OVER 5,000,000 MODELERS KNOW

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FAMOUS BRANDS AT BIG SAVINGS

AHC IS FIRST IN SERVICE
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AMTRON — AN AHC EXCLUSIVE! A FANTASTIC VALUE, TOO!

"SPACE CADET"

HI-FI RADIO CONTROL OUTFIT

OPERATES ANY MODEL . . . BOATS, CARS & PLANES

From ½A to the Very Largest ● Up to 1½ Miles

We've sold hundreds of these terrific R/C outfits! They're made exclusively for us by one of America's biggest and best known Radio Control manufacturers. You Save Many $$$ because of our huge purchasing power. Performance-wise, the "SPACE CADET" outfit is exceptionally dependable and easy to operate. Assembly is extremely simple, too. Operators gives maximum performance. 100% tested and proven equipment! All brand new! No surplus or junk parts! The powerful, hand held TRANSMITTER is a precision instrument, too. Comes in a sturdy all metal case. Complete outfit includes both Receiver and Transmitter . . . plus tubes, escapement, crystal, etc. All for the one low price. All prefabricated assembly, too . . . with easy to follow instructions included.

MADE TO LATEST FCC REGULATIONS, TOO!

GET BOTH THE RECEIVER AND TRANSMITTER KITS

Both for only $14.95 Less Batteries

A Verified $25.00 Value!

ASSEMBLED OUTFIT

Same as Above, But Ready-To-Operate $23.95 Less Batt.

ALL PURCHASED, TESTED AND ASSEMBLED READY FOR USE.

INDIVIDUAL PRICES

"Space Cadet" RECEIVER Kit with All Components, less batteries—only	$ 6.95
ASSEMBLED RECEIVER Ready-to-Use and Tested, less batteries—only	10.95
"Space Cadet" TRANSMITTER KIT, All Components, less batteries—only	8.95
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R/C HEAD PHONES

	Reg.	SALE
#2200—2000 Ohm Dbl.	3.25	2.95
#2242—2000 Ohm Dbl.	4.20	3.95
#2367—1000 Ohm Sngl.	3.75	3.29
#2972—1000 Ohm Sngl.	2.75	1.49

GUIDE TO Radio Control — 25¢ — Covers all phases of Radio Control for models - theory, practice & operation. A must for R/C fans.

20¢ EACH Nylon Gears

#	Teeth	ID Dia.	OD
N1	12	3/32	6/32
N2	24	1/8	17/32
N3	36	3/16	3/4
N4	48	3/16	11/32

½ PRICE

$1.98 R/C Deluxe Receiver INSTALLATION KIT 98c

CRYSTALS 27.255 mc. $6.50 VALUE 2.89 MEETS FCC REQS.

New R/C MC Bands Sale! 26.995; 27.045; 27.095; 27.145 or 27.195 3.95

MILLIAMETERS — AHC Sale on Quality R/C Test Meters

	Reg.	Sale
0-3	$4.95	$3.95
0-5	3.95	2.95
0-50	2.75	2.29

R/C TUBES

	Reg.	SALE
3S4	1.40	.89
XFG1	3.85	2.95
3A5	1.25	.98

2.95 — MINITONE Miniature DC Motor — Ideal power drive for servos, actuators, etc. Less than 2½ ea., 1½" high. Miniature and very efficient. 6 Volt

9.95 — Field Strength Meter — Complete, wired, adjusted and ready-to-operate. Has quality components—includes plug-in antenna, integral meter, plastic case.

TWIN TUBE • PRINTED CIRCUIT AMTRON "Vanguard" DELUXE R/C OUTFIT

Here's the Precision Equipment You Always Wanted at a Fraction of What You'd Expect to Pay!

"VANGUARD" RECEIVER is a superior quality outfit—unmatched for reliability, accuracy and performance. It will fit into just about any model you can find, weighs a mere 1¼ ounces (including relays) and measures 1½" x 2" x 1". Despite its light weight and compact design, it is one of the finest precision R/C instruments ever made. Other features include: low stage single tuning • All printed circuits • Twin diodes • Accurate and positive pin point control at all ranges • Low 15 battery drain as compared with 3 or 4 on most receivers • Saves you countless $$$ on battery costs • No pot required • 22½ Volt battery operation • Transmitter that eliminates sensitivity control • New improved 1A64 tubes • Super sensitive 5000 Ohm Locon relay • Plastic case • All prefabricated and easy to assemble • Complete Instructions and Diagrams included

SALE PRICED AT LESS THAN THE REGULAR WHOLESALE COST!

"VANGUARD" TRANSMITTER is a powerful output instrument with all the precision components found only in the most expensive units. It has a simplified built-in tuning indicator with a one adjustment feature. Tuning-Eye light for E/Z checking. Printed Circuit Chassis. Exclusive new design that reduces "B" battery drain, yet supplies maximum power output. Other quality features include Deluxe Crystal, Powerful 3A4 Tube. Handsome portable Aluminum case that you easily hold in your hand and really easy to assemble construction. The step-by-step assembly instructions are a cinch to follow. R/C fan who have seen the "VANGUARD" TRANSMITTER tell us it's the biggest bargain they ever saw—equal in power and quality to the most expensive!

ASSEMBLED OUTFIT

Same as Above, But Ready-To-Operate All TESTED AND ASSEMBLED READY FOR USE. $34.95 Less Batt.

COMPLETE OUTFIT RECV'R & TRANSM. $24.95 $39.95 VALUE

INDIVIDUAL PRICES

"Vanguard" RECEIVER KIT with All Components, less batteries	$12.95
ASSEMBLED RECEIVER Ready-To-Use & Tested, less batteries	17.95
"Vanguard" TRANSMITTER KIT, All Components, less batteries	12.95
ASSEMBLED TRANSMITTER Ready-To-Use & Tested, less batteries	17.95

R/C FANS!

AHC HAS EVERYTHING YOU WANT! EVERY BRAND! ALL PARTS AND ACCESSORIES! SEND US YOUR ORDER AND GET ALL THE AHC EXTRAS!

RADIO CONTROL

R/C Boat's & Transmitter

Berkeley Aerotrol Mark IV	
Recvr. & Trans. Combo Kits	18.98
A'nal. Mark IV Assembled	24.98

Receivers—Single Channel

Ace Comdr. Kit 8.45 Asmbld.	12.98
Maxie Carpet Mod. 51 Asmbld	27.95
Ace TR Kit Rec'vr. Kit	22.98
Bedeco (Assembled)	24.95
Bedeco (Assembled)	29.95
Cit'ship PA27 12.95 Assembled	21.95
Citizenship 466AR (Assembled)	24.95
Cit'ship 2V27 24.98 SBTR	29.95
CG R1 Kit 19.95 (Assembled)	26.95
CGR1-3V 29.95 CGRX-1	34.95
Dalton R100 (Assembled)	24.95
Dalton R109 (Assembled)	29.95
Space T.N.T. Recv'r Asmbld	21.95
Gyro 22X 16.95 With Relay	21.80
Raytrol R100 13.95 200	19.95
Super Raytrol R135 (Assembled)	25.95
Tone Aerotrol (Assembled)	29.96

Receivers—Multi Channel

(2) CG RT2 (Assembled)	44.95
(2) CG RT2 (Assembled)	69.95
(3) CG RT3 (Assembled)	79.95
(3) CG RT5 (Assembled)	119.80
(8) Bramco "Regent 8" Asmbld.	110.00
(8) Citizenship MSR-8	99.95
(8) CG RT8 (Assembled)	139.50
(8) Citizenship SS-MSR8	149.96
(10) Bramco "Regent 10"	150.00
RAYTROL (3) Assembled	64.50
(5) 84.00 (6) 97.75 (8)	124.00

Transmitters—Single Channel

Ace Comdr. Kit 9.95 Asmbld.	14.98
Magic Wand Kit 19.95 Asmbld.	24.95
Bedeco (Assembled)	34.95
Bramco Trans. (Assembled)	36.95
Cit'ship CTX (Assembled)	39.95
Cit'ship Kit 15.95 Assembled	19.95
MRT Cit'ship Kit Transistor	19.95
MTE Cit'ship Assembled	26.95
Citizenship 466MC (Assembled)	34.95
Citizenship 466MC Transistorized	26.95
CG T12 Kit 24.95 (Assembled)	33.95
Dalton T99 (Assembled)	21.98
Dalton T100 (Assembled)	29.95
Gyro RX1 Trans.	49.50
Raytrol 5800 (Assembled)	49.95
Super A'trol 19.95 (Assembled)	24.95
Tone Aerotrol (Assembled)	49.95

Transmitters—Multi Channel

(2) Babcock 466MC (Assembled)	69.95
(2) Citizenship 8EX (Assembled)	59.95
CGT3 59.95 CGT8	99.50
(3) CGT8 Assembled	99.95
(8) Citizenship MST-8	99.96
(8) Bramco (Hand Held)	116.00
(10) Bramco (Hand Held)	131.00
RAYTROL (3) (Assembled)	88.00
(5) 68.75 (6) 79.20 (8)	98.80

BOOKS

AHC HAS 'EM ALL

Order the Radio Control Reference Books You Want From AHC. If It's in Print, We've Got It!

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Model Con. by Radio E. Safford 1.00
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R/C for Planes & Boats by Winter 1.00
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Guide to R/C, Winston Minibook .25

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Gem Relay 5000 ohm 4.25; 7500	4.75
Gem Micro 5000 4.95; 7500	5.45
Super Aerotrol Escapement	3.95
Berk. DE Relay 7.50 Comp. Escap.	8.95
Babcock Elec. Comp. Escapement	9.95
Babcock Positionable Servo	12.50
Babcock Proportional Servo	14.50
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Babcock Super Comp. Escap.	7.95
Babcock Mfr. Control Escap.	8.95
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Citizenship Escapement $ 95; S.E.	7.95
Citiz. Servo HRM-2R2H,1R3H 3R 14.95 Kit	11.96
Cameron SN Escapo (2 pos.)	8.95
Cameron SN Escapo (3 pos.)	8.95
Cameron Compound Escapement	8.95
Cobb Escap. 2 or 3 Pos.	8.95
Cobb Elec. Comp. Electro SN	9.95
Electro 3 Pos. 8.95 Elec. Comp.	9.95
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Bonner Vari-Comp. Escap.	8.95
Dual 10.95 Propeller Elev.	9.75
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2 P2N 11.95; 3P 10.95; 5PN	24.95
2P2HX, 3PHX or 3P3HX ea.	14.95
Multi-Servo Rudder L or R	18.95
Multi-Servo Elevator U or D	18.95
Relay (Ambroid) Super Sensitive	8.95
Citiz. IRE Inst. Kit	4.95
U-15 Battery Box 1 cell, 30; 2 cell	.50
Battery Boxes: 1 cell .25; 2 cell	.50
2 cell 65; 4 cell .85; specify battery	
Tubes: XFG1 2.00; 3A5 - 1.25; 1A64	2.95
3V4 1.75; 1U4 1.75; 1U8	1.80
Test Meter (Citizenship)	22.95
Batteries: Eveready #467, 67"V	1.50
XX30 or 455, 45V	2.95
4P or 742, 15 V	1.65
U15 or 412, 22½V	1.50
0-3 Milliameter 4.95 0-50	2.75

R/C MODELS

Berkeley "Astro-Hog" $15.95
Sensational winner of 1st, 2nd, 3rd & 4th place in Model-1958 Nationals. 72" span. Length 66". For .30 RC engines. Order yours from AHC.

Babcock "Tri-Pacer" $9.95
Fuel-proofed plastic model for R/C, F/F, or U-Control flying. 32" wingspan, all parts to assemble in a few hours.

ASBONCA CHAMPION NEW All Plastic, 40" Span For .049 to .074 Eng. 9.95

Aero 9 - 40" .09 to .15	8.98
Aero 15 57" .15 to .19	11.98
Aeronca C3 36" .020 - .099	2.98
Aeronca C3 40" .09 to .19	6.95
Aeronca Champion 37" Fleet .049	9.95
Aircoupe 45" .074 to .29	7.95
Astro Hog 72" .35 to .45	34.95
Bird Dog 36" .98 AA	2.98
Bushhopper "A-RC" 64" AA-A	4.98
Cessna Jr. 42" .049 - .074	6.95
Breezy Sr. 56" .09 to .23	14.90
Bull Pup 37" .049	3.88
Buster 48" .15 to .35	9.95
Cessna 170 72" .25 to .35	14.95
Cessna 172 - 54" .09 to .19	9.95
Cessna 180 35" AA	2.98
Cessna 180 48" .09 to .18	6.95
Clipper 34" AA	2.98
Custom Livewire 66" .25 to .35	21.95
Custom Privateer 114" .45 - 1.2	19.95
Dc Havilland Beaver 48" .035	6.95
Douglas B26 Invader 88" .15-.25	16.90
Enguero 80" .049 to .099	9.95
Explorer 56" .15 to .25	14.95
Fairchild PT-19 72" .15 to .29	24.95
Fairchild PT-19 - 48" .09 to .19	9.95
Fokker D-7 - 28" .049 to .074	4.98
Helioplane 29" .049 to .14	4.98
Kitten 34" .020 to .074	4.95
Livewire Champion 56" .15 - .19	13.98
Livewire Trainer 48" .09 to .15	9.98
Livewire Rebel 48" .074 to .09	9.98
Livewire Super Cub 56" .15 - .19	13.95
Luscombe Sedan 76" C-D	9.98
Mambo Trainer 48" .049 to .099	9.98
Mini Tote 46" .049 to .074	3.98
Monocoupe 40" .19 to .45	9.95
Narvon Super 260 68" .35 to .45	16.98
Piper Cub J3 54" .09 to .35	7.98
Piper Cub J3 54" .074 to .15	6.98
Piper Cub J3 71" .15 to .25	10.98
Piper Tripacer 44" AA-A	6.98
Piper Tripacer 77" Fleet .049	9.98
Piper Tri-Pacer 60" A-B-C	12.95
Rayet Rudderbug 62" A	8.95
Sea Cat 68" .15 - .25	9.98
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Sioux Hoop 72" .29 to .35	27.95
Spirit 54" .09 to .23	10.98
Super Buccaneer 90" C-D	14.95
Waco Cabin 52" .15 to .29	9.98
Waco Cabin 36" .049 to .099	3.98

RADIO CONTROL BOATS

Carretta 48" (Sterling)	26.95
American Scout 50" (Sterling)	16.95
Ocean Toy 35" (Veco)	24.95
Owens Bridge Sedan 22" (Ideal)	10.95
Sport Fisherman 42" (Ideal)	24.95
Constellation 27" (Berkeley)	6.95

Wow!

38" SPAN — FOR USE WITH .35 to .09

BRIGADIER "RC-38" Cleanest Fly 4 F.F., R/C or Free Lead. A real buy! $1.95

REG. $5.95 $3.95 — Compound Escapement — Converts single channel R/C sets to multiple control. Completely assembled . . . the finest heavy-duty unit you ever buy. Carries our famous Money Back Guarantee.

R/C ALIGNING TOOLS — REG. 65¢ — 39¢ — Choice of Flat Screwdriver or Hexagon Tip

SALE!

	REG.	SALE
6000 Ohm Sigma Relay. Sale	2.95	1.69
Little Jewel 5000 Ohm Relay		2.75
RBM Palladium Contact Relay		3.75
GEM 5000 Ohm Relay	$4.25	
Micro Relay		4.95
Self. Neut. "Amtron" Escape.	3.95	2.95
Dean Reed Bands — 6 Reed		22.95
6 or 8 Reed		34.95
Multi-Pin Plug & Socket Sets.		.59
2 or 3 Prong		.50
4, 5 or 6 Pin .30 7 or 9 Pin		.35
R/C Plugs or Jacks, Std. ea.		.15
R/C Telescoping Antenna	3.00	1.75

AIR-SEA RESCUE BOAT REG. $12.95 — 6.95 — Terrific R/C boat model that you buy at almost half price. 30" overall length, 8" beam. Easy to assemble balsa hull structure with mahogany planking. For .09 to .19 eng. (or 2 elec. motors).

PRICE SALE

AHC SAVES YOU $$$ ON THESE FAMOUS "BABCOCK" R/C INSTRUMENTS

2 CHANNEL 465 mc. Transmitter BCT-7

By far the finest, most reliable unit made.

REG. 69.95 34.95

R/C Fans! Here's your chance to own the "Cadillac" of R/C equipment at tremendous savings. The BABCOCK BCT-7 is the world's finest modulated multi-channel UHF frequency transmitter . . . FCC type approval #CR425. Features include: High frequency 5 and 7 Kc. modulation. 3 element antenna for superradiation efficiency included at no extra cost. Built-in voltage indicator. Convenient hand-held size . . . 8¼x6¼x3. Both channels can be operated simultaneously or independently. Fully factory assembled and tested. This is the Brand New 1959 model . . . and quantity is limited! Order this AHC super bargain now . . . while the supply lasts!

SINGLE CHANNEL TONE RECEIVER BCR-8

FOR USE WITH MT-7 TRANSMITTER See Below

REG. $30.86 — 19.95 — 5 Ke. or 7 Ke.*

*Your choice of either 5 Kc. or 7 Kc. cannels—the above transmitter for operation of either or both units.

NO TUBES! COMPLETELY TRANSISTORIZED!

One of the finest, most reliable, most sensitive precision units you can buy. Features a unique advanced circuitry that offers interference immunity. Uses the popular 5K super sensitive relay. Has rugged, metal case and built-in battery holder. Only 6½ ounces. Simple to install. Simple to use. Wiring antenna plus full installation instructions and diagram booklet included. Fully factory assembled and tested.

Order Two Receivers & Save An Extra $5.00 $34.95

Reg. $79.90. Get Both (Mix'em or Match'em) For only

FREE $7.95 COMPOUND ESCAPEMENT IF YOU ORDER BOTH Transmitter and Either Receiver

Limited Quantity! Rush your Order!

WET CELL STORAGE BATTERIES

High capacity, long life. The finest made for R/C use.

2V-3A	1.39	2V-6A	3.75
2V-6A	2.39	W/CASE	2.95
2V-12A	5.75	6V-4A	3.39
Baby Wet 4 V 1.5A			1.45

R/C Battery CHARGERS ASSEMBLED

ESSCO UNIVERSAL 0.95

2 Volt Reg. $5.95 4.95 — 2-6 V. Reg. $7.95 6.95

5.95 Famous "Weller" SOLDERING GUN

Standard professional soldering gun that gives instant heat. Handsome hi-impact housing.

Use Handy AHC Order Blank on Next Page

Send Order To: America's Hobby Center, Inc., 146 West 22nd St., New York 11, N. Y.

ORDER-BY-MAIL FROM "AHC" . . . THE HOBBYIST'S SUPERMARKET FOR SUPER

SAVINGS

YOUR "ONE STOP" SHOPPING CENTER FOR ALL YOUR HOBBY NEEDS

COMPLETE FLYING OUTFITS

FREE BONUS OFFER

Free of extra cost with every plane and engine.

Buy your engine and plane from us at the same time and get all of your accessories FREE!

STANDARD MODEL ONLY
Correct Size Finished Propeller — Engine Handbook — 18" Insulated Ignition Wire — Insignias — Giant Book on Construction — How to Build and Fly Them — Cement — Sandpaper — Metal Ballcrank with Bolt, Nut and Washer — Elevator Horn — Elevator Hinges — Lead-In Wire — Push-Rod Wire - U-C Handle - Control Lines - Ownership Decal

NOTE: You may substitute any plane or engine of equal value for any plane or engine included in these offers. Choose from the listings in the first AHC ad.

2 PLANE OUTFIT

Believe it or not! 2 COMPLETE PLANES
Make and fly BOTH these 18" profile models

PLUS

SPACE BUG JR. .049 — F-86 SABRE

F-51 MUSTANG

PLUS ACCESSORIES AND BONUS EXTRAS

BIG $10 flying outfit FOR ONLY 5.99

With Cub .049 $7.39

BIG $10. VALUE

NOW ONLY $7.50

PLUS ENGINE of your choice

With O.K. Cub .049 Engine $8.95

.049 ENGINE

PLUS ACCESSORIES AND BONUS EXTRAS

X-15 RACER — SUPER STUNTMASTER — BRITISH S.E. 5 — F-51 MUSTANG — CHIPMUNK — DELUXE BASIC TRAINER

Take your choice of one of these U-Control models. Each is completely prefabricated — easy to assemble and fly!

FREE FLIGHT OUTFIT

DELUXE $15.00 OUTFIT

FAMOUS CONTEST MODEL

AMAZON "400"

62" SPAN

PLUS

MEETS F.A.I. and A.M.A. RULES

Thoroughly tested and contest proven! AHC brings you this smart Giant Free Flight outfit . . . and we've bargain priced it, too! The "AMAZON 400" is light, rugged and efficient . . . designed to assure every kind of climb possible for its diamond wing and tail glide. It is all pre-fabricated . . . with selected balsa and plywood parts and full size thoroughly detailed plans.

NEW & POWERFUL FOX .15 ENG.

& COMPLETE AHC BONUS EXTRAS, P.P. ACCESSORIES, ETC. . . . . WORTH MANY $$

SALE

	REG.	SALE
Scale Team Racer 2¾" Plastic Pilot	.25	.09
2" Race Car Wheels (4) ½" wide	1.20	.59
Electric Outbd. Motors 3-6V., powers model boats up to 24"	2.95	1.99
Speed Kit St. Louis, ½A U-Control, 18"	2.95	1.95
Model Builder's Alum. Block Plane	.50	.29
Electric Motor, U.S. made, 1½"	1.98	.69
Modeler's Knife Set (6 Pc.)	1.79	.98
Kellett Autogiro, ½A U-Control, 18"	1.95	1.39
Model Builder's Saw (for wood & metal)	.60	.39
Hobbyist's Screwdriver Set (6)	2.25	1.49
Rev-Up Lubricant (adds 859%!) to 8oz.)	.50	.29
"Air Racer" ½A U-Control model, 18"	3.29	1.95
Fox Glo Plug Wrench	.60	.39
"Sky Mate" - ½A U-Control model	2.95	1.95
"Aggravator" U-Control Trainer, 24"	2.25	1.98
U-Control Wire (.008-100 Ft.)	.60	.39
Modeler's Carving Knives (12 assrd.)	1.98	1.49
"Rocket" Race Car (18") ½A Eng.	1.29	1.29
88ci .15 Diesel Engine	13.95	7.95
Set of 12 Hobbyist's Files in Case		2.50
Midget Elect. Motor 1½-3V, Imported		.39
Engine Muffler (A-B-C) suits noise	2.95	1.69
Skyball Tissue (24 x 36) 10 Sheets	1.00	.49
Ignition Spark Coils with ht tension wire clip	2.00	.98

IMPORTED MODELS

SA-16 Albatross 52" (2) .19-.35	25.95	19.95
Beech Bonanza 36" .19 to .35	10.00	7.95
F-8-F Bearcat 36" .29 to .35	10.00	7.95
B-29 Boeing 60½" (4) .09 to .15	29.95	19.95
B-29 Boeing 84¾" (4) .19 to .29	39.50	27.95
F-4U Corsair 31" .29 to .35	10.00	7.95
C-47 Douglas 48" (2) .15-.19	24.50	19.95
PW190 Focke Wulf 36" .29-.35	10.00	7.95
ME109 Messerschmit, 36" .29-.35	10.00	7.95
F-51 Mustang 36" .29 to .35	10.00	7.95
L-17 Navion 39" .19 to .29	10.00	7.95

WEN MAC .049 ENG-INE

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Sterling

21" Chris-Craft Cobra Speedboat

With Free Elec. Motor

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ADDITIONAL FUEL — 35c

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WEST GERMANY 1959

During the 1958 slope-soaring Nationals, on the main slope of the famous Wasserkuppe/Rhon, the traditional home of the German Aero Club. Real gliders used the soaring area for years.

Lothar Piesk, outstanding A/1 and A/2 designer, is noted for high-climbing free flights. These include, left, .09 Taifun, and Mach 1 jobs. A two-piece wing, timer cut-out, and auto-rudder.

Georgeous Dornier 335, OS Max .35 tractor, Rosant .15 pusher. Insulated lines (3) for Distler motors, flaps, retracting gear, landing light. Controllable identification lights. Nats 2nd!

by BILL PARK

From scratch 10 years ago German modeling has made a sensational comeback. To the builders, unique blend contests, science, is fun.

Ten years ago, West Germany was a beaten country where most people were hard put to find something to eat. The struggle for existence among the ruins was almost indescribably hard. All kinds of aviation activity, including model flying, were strictly banned, and yet here and there small groups of modelers "organized" some materials and tried to get things going again. There was even a model magazine, "Flugmodellbau," which is still going strong today. Gradually the restrictions were slackened in the US, British and French Zones—but not in all at the same time. Hans Geiger, noted tailless glider expert from Tuebingen, recalls how he used to have to smuggle his ships in a violin case from his home in the French Zone (the last to relax restrictions) to contests in Stuttgart, in the US Zone. Such barriers were always surmounted by ingenuity, hard work and a lot of idealism. Today these same qualities help keep West Germany among the leaders in international contests.

The ban on flying, while to be regretted, was to a great extent justifiable. Before the war, modeling in Germany was sponsored by the government for one purpose—the training of future military pilots, first with models and later with sailplanes, Model Schools, building classes in (*Continued on next page*)

Preparing for RC demonstration, Stegmaier with transmitter, Bernhardt on motor. Known throughout Germany for combat, formation exhibitions, two are partners producing Stegmaier 8-channel.

Popular and successful in Europe is Palmer designed Thunderbird. Dieter Kroh, 16, a Nats 5th.

Karl-Heinz Denzin, edits Modell, top kit designer, a glider expert. At wing tip, Rudi Lindner.

Helper holds all-sheet A/2 by Ingo Rechenberg: used 1 mm. balsa top, bottom, wing; turbulators.

Class N/2 (tailless rubber), Walter Schubert, a 585 sec. total for five, '57 Nats. Forward fin.

WEST GERMANY 1959 . . . continued

high schools and contests were organized by the "National Socialist Flying Corps" (NSFK) with all the discipline and uniformity of a military unit. Even the youngest member wore a uniform, and commander of the corps held the rank of general. Fliers marched in formation to the flying field and the modelers who didn't belong were not allowed to fly in contests. There was a close connection with the Hitler Youth organization, and politics were considered just as important as aerodynamics. While the general standard of modeling did improve, the individualism that produces really great advances was lacking, and gradually flying as a sport was forgotten. After the devastation caused by both sides during the war, no one was willing to allow even model flying for fear that it might one day be used for political and military purposes.

Today, fliers are organized into a loose confederation under the German Aero Club (D. Ae. C.), which is divided into five sections: Lightplane, Sailplane, Model, Parachute Jumping, and Balloon. Likewise, each of the 10 "Lands" (roughly, states) and West Berlin have their own aero clubs, which govern flying within the area. It should be pointed out here that the Land Aero Club wields a great deal of power, since the D. Ae. C is an association of Lands, unlike the AMA, which is an association of individuals. Membership dues are collected first by the Lands, which in turn pay a percentage to the national body. The Land Aero Club also selects the contestants for the Nationals by eliminations, and pays part of the traveling expenses to national and sometimes international meets. Each has its own policy, and no two are exactly alike in the method and extent of support which they give to model fliers.

All flying is done exactly according to FAI rules, (except for processing) even at the smallest meets. In free flight, timed rounds are strictly adhered to, and the flier who doesn't retrieve his ship by the end of the round and doesn't have a reserve is usually out of the contest, just as he would be in the World Championships. This toughness has paid off in the high standard of German international teams. Most contest fliers specialize in one class, even to the extent that an A/2 flier will not fly A/1, and so on. Normally, there is just not enough time during a round to fly two classes. The fliers who make the teams usually do not fly in contests (even the Nationals!) before the World Championships, but they do practice very hard, flying in all possible weather conditions.

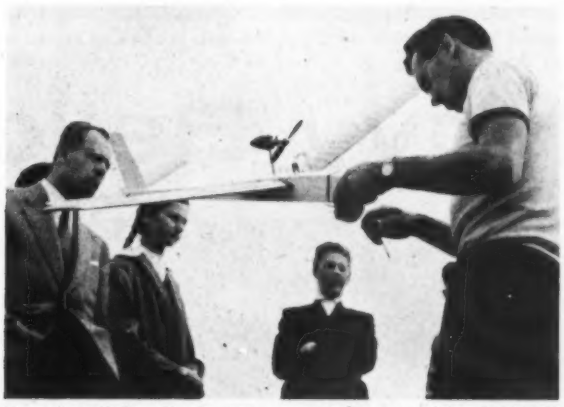
The most popular type of model flying is free flight, partly due to its cheapness and partly to the general availability of space which has prevailed until now. However, more and more land is being taken over for building, and

Two-piece wing, auto-rudder, cutout combined, on Herbert Tlach design. Five-max took second.

Fine RC delta, F. W. Biesterfeld, Max .35. Excellent take-offs, but overstable for aerobatics.

U. S. military markings popular in W. Germany for semi-scale ships. Fourth at '56 Nats.

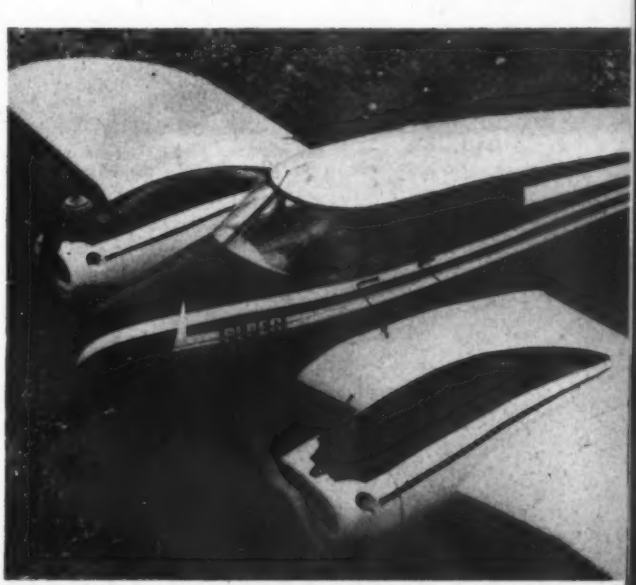
Winning team in T/R, Baden-Wurttemberg Land Champs, in '58. Micha Mueller, L, flew 2.5 cc job. Horst Diemer is German stunt champ.



Hopped-up Webra Piccolo .049 powers R/C meter-glider, by Ewald Traenkle (flies with/without power egg). Proportional on rudder.

the German Air Force is reclaiming its airfields one by one. Some clubs are beginning to feel the pinch. Stuttgart, one of the most outstanding free flight areas in the country, has lost all of its three fields; Hamburg may soon lose its field (a disused wartime airfield) to the Air Force. West Berlin, of course, has always been in a difficult position: the only area to which the local boys have access is French-occupied Tegel, which every now and then is closed to them. The alternative is to fly in the DDR (the old Russian Zone), which many do not wish to do, for personal or political reasons. Despite this, they continue to place high on the Nationals list. Other clubs have to use fields far out of town which cannot be reached by public transportation (remember, most Germans do not have cars!) However, Germany is still well off compared to many parts of the US, but how long it will last is hard to say.

Next to free-flight, R/C is probably strongest. Excellent equipment is available in a wide price-range, and many people make their own. Until recently, however, there was no suitable trainer on the market; this has now been remedied by the production of the deBolt Live Wire Trainer under license by a German firm. Webra is now selling a diesel with built-in vacuum pump, which allows the use of Stegmaier 8-channel equipment without necessitating the expensive hand-made two- (*Continued on page* 56)



Piper 23 Twin-Apache, Werner Liebke, has retractable gear worked by electric motors. All pictures by Otger Schmolinske and author.

How's this, dad? Nifty, we'd say, and those old insignia sparkle. Good for sport flying.

Navy Bellanca

Silver airplane with chrome yellow on top surface of wing, black trim, decals, follow Navy color scheme of the time. Ship stunts best on a .23—if you must. A sight on 100-ft. Mono-line.

In their time, Bellanca's with efficient wings, lift struts, and airfoil-profile, great weight lifters. Apparent wing droop, optical illusion. Lay ruler along wing trailing edge center pic!

by WALTER MUSCIANO

Generous wing area makes the ever-popular cabin job good flier on engines of .19-.35 displacement. Not bad stunter — been proved.

► Profile scale and semi-scale stunt control-line jobs are very popular. However, these seem to be half-way measures which result in good stunt models but poor scale jobs. There are numerous full-size planes which are readily adaptable to scale stunt replica with little or no modification.

All pre-war Bellanca single-engine airplanes are ideal candidates for stunt models with their enormous wing area and moderately short tail moment arms. Several have been built and flown successfully by the author. The latest is presented here and sports U.S. Navy colors and markings which are authentic. This craft is almost identical with the commercial Bellanca "Skyrocket" but it was felt that it would appear more logical if a Navy craft was seen executing intricate maneuvers rather than a private plane!

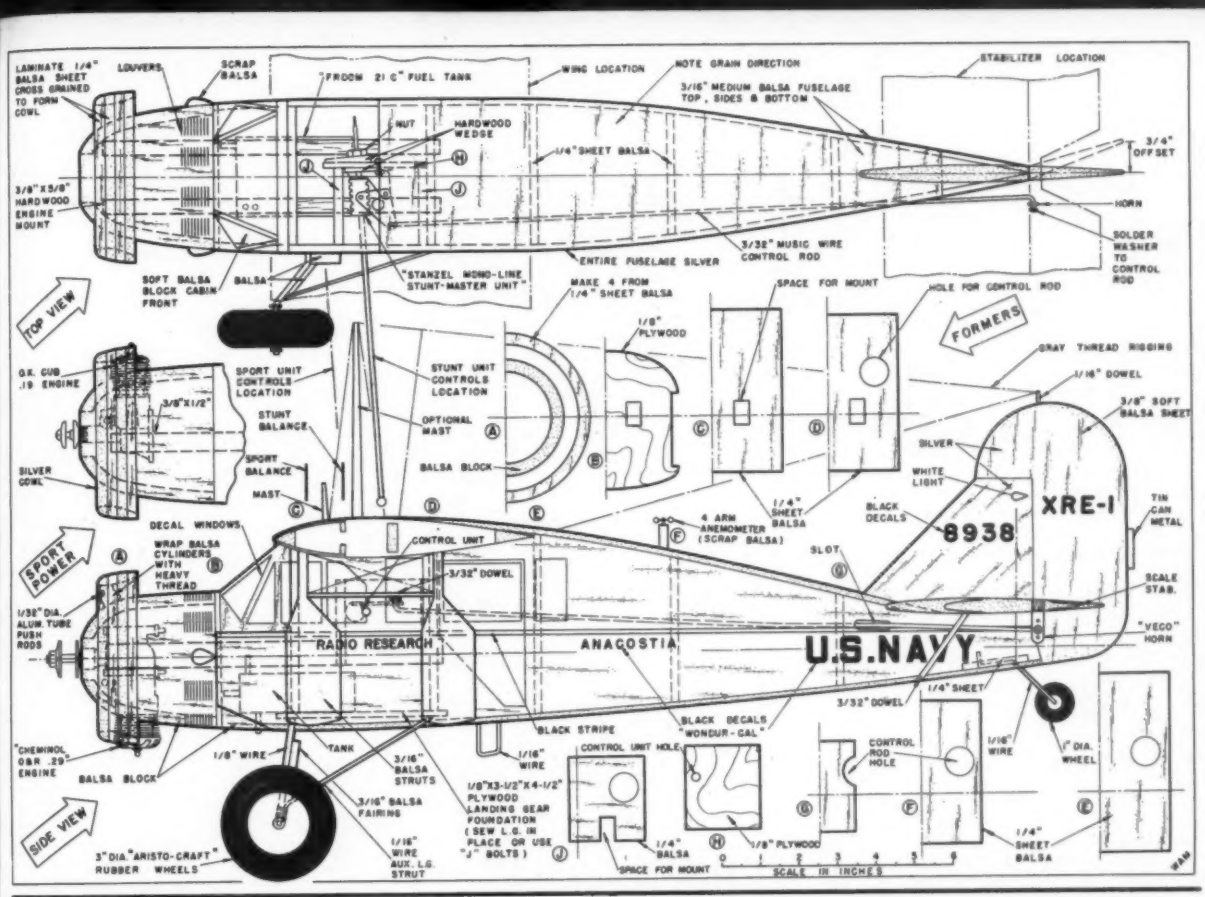
Our model of the Bellanca XRE-1 Navy personnel transport, cargo carrier and liaison plane was built to the scale of one inch equals one foot. Any engine of from .19 to .35 cubic inch displacement can be used; we consider a .23 to be ideal for good stunting in this model.

As part of our scale multi-engine, scale-speed and scale-stunt evaluation models using Mono-line controls, our XRE-1 was fitted with a Stanzel "Stuntmaster" Mono-line control system. The prototype model exceeded our highest expectations of performance at the end of the single line. Those model builders who are interested in sport flying can install a conventional Mono-line control mechanism in the sport location shown on the plans. The model should balance at the forward balance location for sport flying.

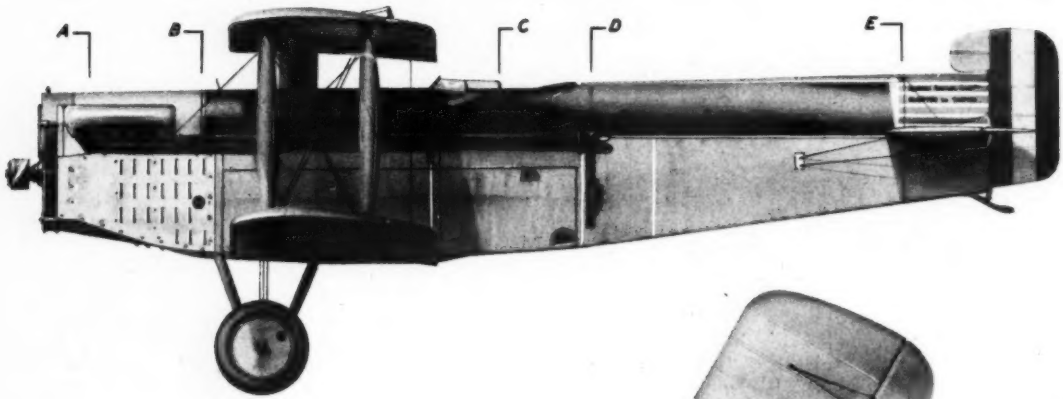
The wing span is under four feet with a projected area of 300 square inches. Airfoil is original with a 15 percent thickness, with a sharp leading edge which we have found to be an advantage on control-line craft. Wing construction is strong but light while the fuselage is a simple box.

Construction begins with the fuselage by cutting the bulkheads, formers and sides to shape. Cement the sides to the formers, using pins as clamps. Pull the sides together at the rear and set aside to dry.

The Stanzel (*Continued on page* 59)



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.


A
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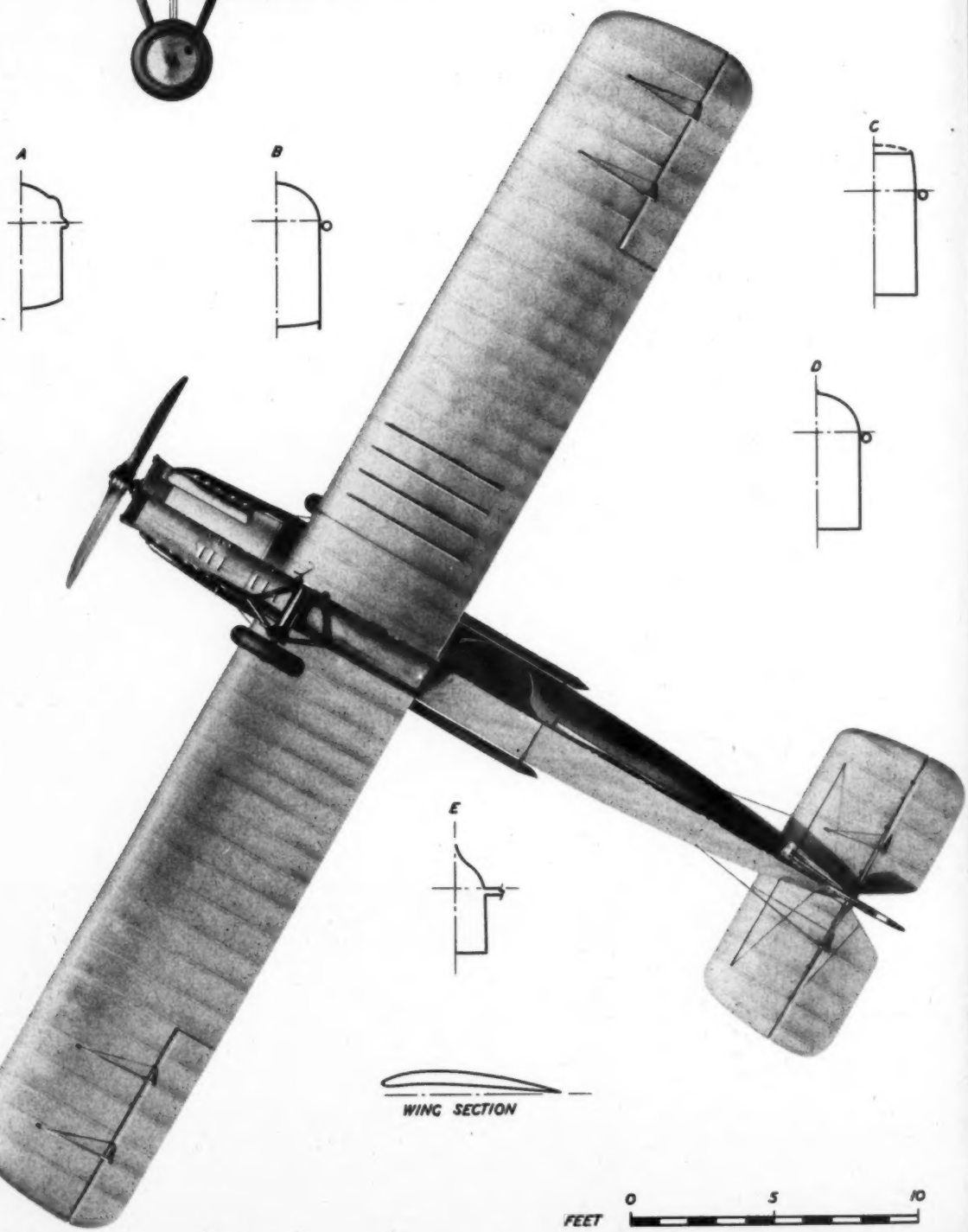
D
E


A
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WING SECTION
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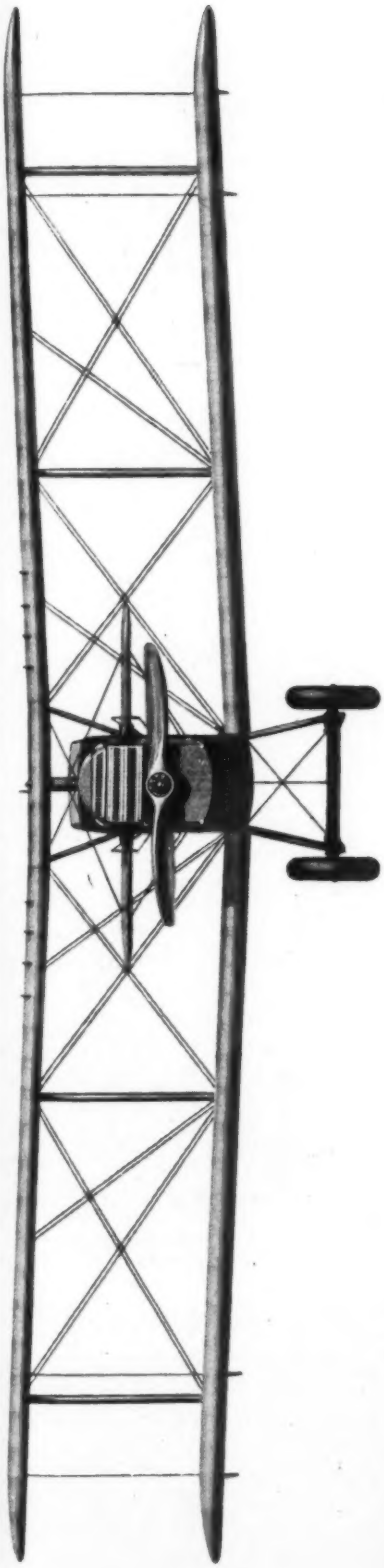


Two-place Atlantic a modified 5-passenger transport, took only six weeks to build. Hawker had argued twin (that day) no safer since descent inevitable with failed engine, full load.

men and ships

by ROY CROSS

Hawker, sometime before 1914. In 1912 he set a duration record of 8 hrs., 23 mins.; alt. 1913.

Best known for his 1919 attempt to fly Atlantic in Sopwith bipe, Harry Hawker, intrepid pilot.

Among the greatest series of fighting scouts evolved during the first World War was that emanating from the Kingston-on-Thames works of the Sopwith Aviation Co. Ltd. And one of the chief contributors to the firm's rapid rise to fame and fortune from its formation in 1912, second only to T. O. M. Sopwith himself, was Harry Hawker.

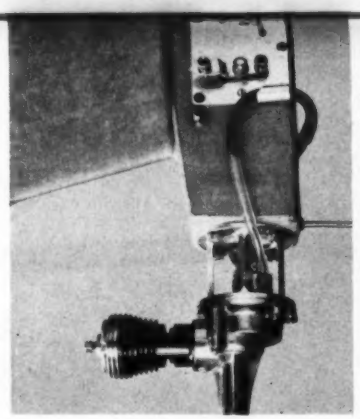
Idol of pre-1914 flying-meet crowds, demonstrator of the early Sopwith products, closely involved in the design and testing of the great wartime machines, best known for his 1919 attempt to fly the Atlantic, Hawker has his name perpetuated in the trade name of another great fighter manufacturer, Hawker Aircraft, Ltd. (*Continued on page* 46)

Ship with 4-bladed prop, "windmill" generator extended from fuselage slot. Rear portion fuselage was given a boat shape at top. Rolls Royce 360 hp Eagle famed WW1 engine—Merlin WW2!

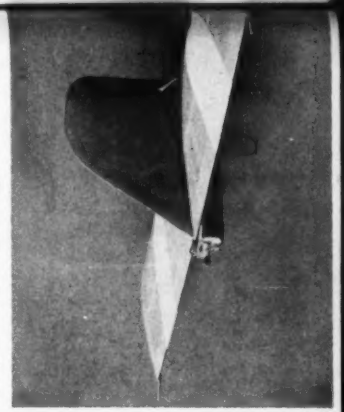
half alpha

by HARRY E. HARPS

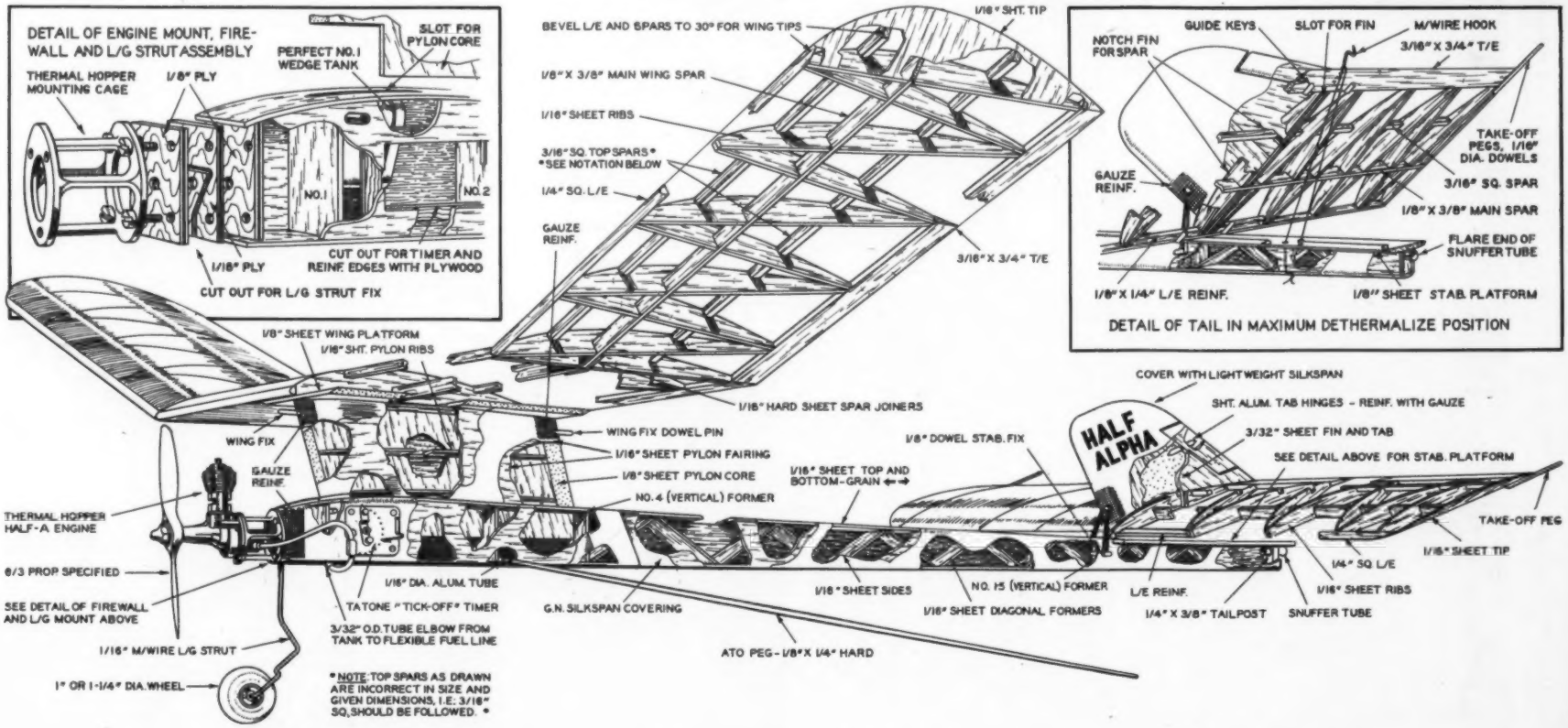
The Thermal Hopper easily drags upstairs the 310 sq. in. model. Ship very easy to trim out.

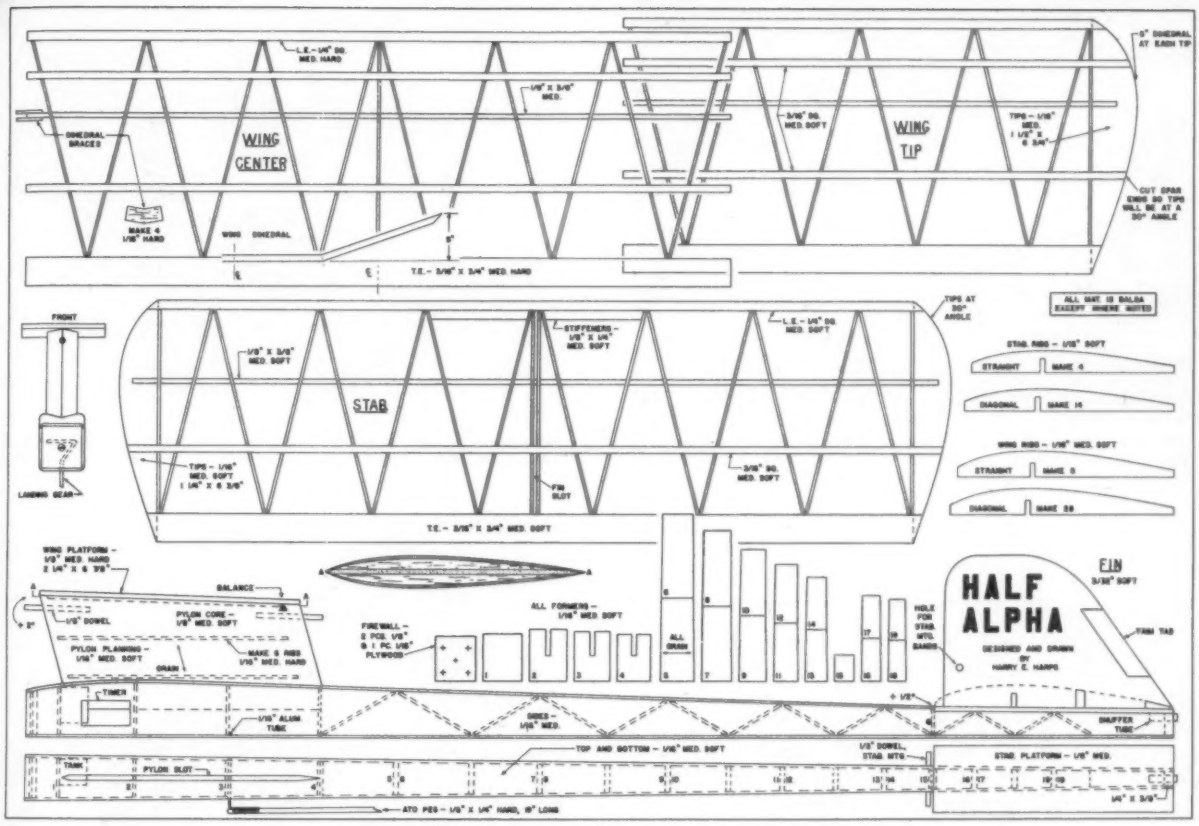


Line curves smoothly engine through timer to brass elbow glued in planking—exact cut-off.



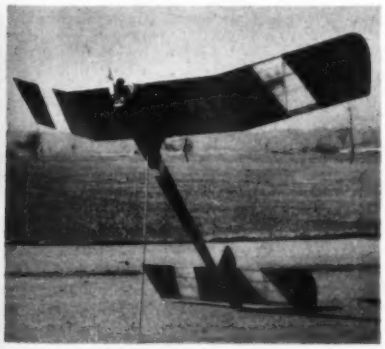
Pop-up tail dethermalizer, showing hooks, the rubber band, fuse. See "Pop It" in May MAN.


DETAIL OF ENGINE MOUNT, FIRE-WALL AND L/G STRUT ASSEMBLY
THERMAL HOPPER MOUNTING CAGE
1/8" PLY
PERFECT NO.1 WEDGE TANK
SLOT FOR PYLON CORE
NO.1
NO.2
1/16" PLY
CUT OUT FOR TIMER AND REINF. EDGES WITH PLYWOOD
CUT OUT FOR L/G STRUT FIX
BEVEL L/E AND SPARS TO 30° FOR WING TIPS
1/16" SHT. TIP
1/8" X 3/8" MAIN WING SPAR
1/16" SHEET RIBS
3/16" SQ. TOP SPARS *
*SEE NOTATION BELOW
1/4" SQ. L/E
GAUZE REINF.
3/16" X 3/4" T/E
1/8" SHEET WING PLATFORM
1/16" SHT. PYLON RIBS
1/16" HARD SHEET SPAR JOINERS
WING FIX
WING FIX DOWEL PIN
1/16" SHEET PYLON FAIRING
1/8" SHEET PYLON CORE
NO. 4 (VERTICAL) FORMER
GAUZE REINF.
THERMAL HOPPER HALF-A ENGINE
6/3 PROP SPECIFIED
SEE DETAIL OF FIREWALL AND L/G MOUNT ABOVE
1/16" M/WIRE L/G STRUT
1" OR 1-1/4" DIA. WHEEL
1/16" DIA. ALUM. TUBE
TATONE "TICK-OFF" TIMER
3/32" O.D. TUBE ELBOW FROM TANK TO FLEXIBLE FUEL LINE
* NOTE: TOP SPARS AS DRAWN ARE INCORRECT IN SIZE AND GIVEN DIMENSIONS, I.E: 3/16" SQ. SHOULD BE FOLLOWED. *
G.N. SILKSPAN COVERING
ATO PEG - 1/8" X 1/4" HARD
1/16" SHEET SIDES
1/16" SHEET DIAGONAL FORMERS
NO. 15 (VERTICAL) FORMER
L/E REINF.
1/4" X 3/8" TAILPOST
SNUFFER TUBE
1/4" SQ L/E
1/16" SHEET RIBS
1/16" SHEET TIP
TAKE-OFF PEG
1/8" DOWEL STAB. FIX
1/16" SHEET TOP AND BOTTOM - GRAIN ←→
COVER WITH LIGHTWEIGHT SILKSPAN
SHT. ALUM. TAB HINGES - REINF. WITH GAUZE
3/32" SHEET FIN AND TAB
SEE DETAIL ABOVE FOR STAB. PLATFORM
HALF ALPHA
NOTCH FIN FOR SPAR
GUIDE KEYS
SLOT FOR FIN
M/WIRE HOOK
3/16" X 3/4" T/E
TAKE-OFF PEGS, 1/16" DIA. DOWELS
GAUZE REINF.
3/16" SQ. SPAR
1/8" X 3/8" MAIN SPAR
FLARE END OF SNUFFER TUBE
1/8" X 1/4" L/E REINF.
1/8" SHEET STAB. PLATFORM
DETAIL OF TAIL IN MAXIMUM DETHERMALIZE POSITION



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.

For new rules, this Half A free-flight consistently betters 3:20 in dead air.



In ATO position. On take-off, peg retracts against stab bottom. Sponge wheel made weight.

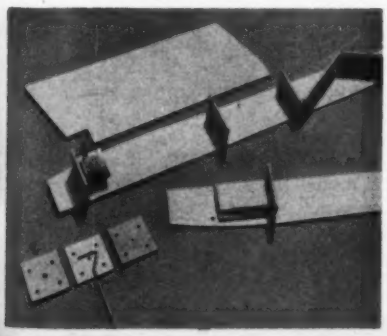
►A few days after the new free-flight power loadings were announced, Half Alpha came off the workbench. Although designed specifically for the new loadings, Half Alpha is a direct descendant of an .09 Torpedo-powered model flown under the Class A banner.

After more than 20 months and many refinements, that fourth, final, Class A model proved contestworthy. During the latter part of the 1958 season, nearly 88% of its official flights were maximums. Needless to say, the next step was to work up a ¼A configuration with these same attributes.

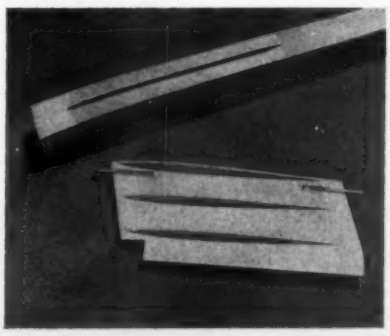
A 310 square inch wing area was decided upon. This 3.9 ounces per square foot wing loading compares favorably with that of other, high performance free flight models. Yet the drag is low enough so a Thermal Hopper is still capable of hauling the model upstairs. The 45% stabilizer was retained with flat-bottom wing and stab airfoils and 1½ degrees decalage (angular difference between wing and stab). Nose and tail movement arms were adjusted accordingly.

So far, no one has devised a foolproof setup (*Continued on page* 40)

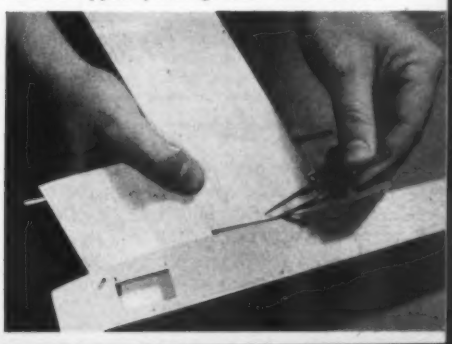
Preassembly: three ply layers in firewall; pylon core blank; top; fuel tank is in position.

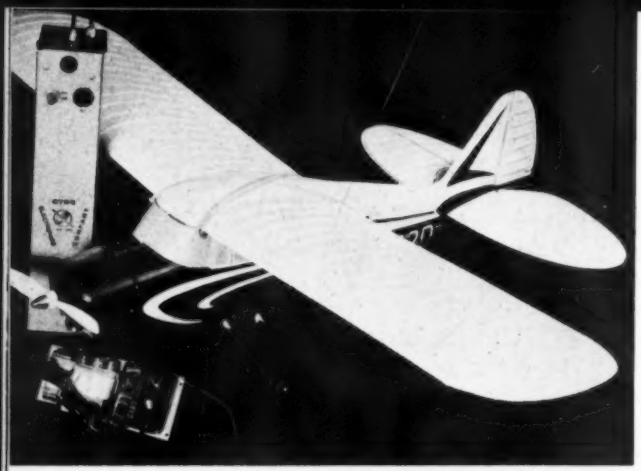


Ribs in place, edges tapered, dowels installed pylon ready to cement in slot in fuselage top.

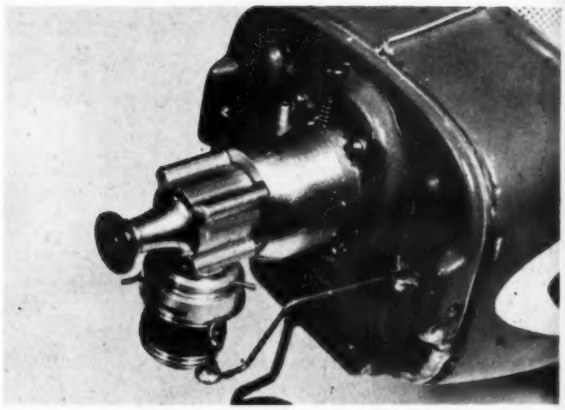


A pair of dividers used to scribe fuselage top curve on pylon planking. Note timer cut-out.





One man's Tri-pacer: Babcock's plastic job by John Schneider, using Gyro hand-held and 22x receiver. Batteries, r'cvr, fit on board.



For power he used inverted Cox with a Roto-Valve exhaust throttle. Plane assembles from shells, etc., with certain contact cements.

radio control news

by EDWARD J. LORENZ

Glory be to progress but if you fell off at last curve, salve those bruises with a spot of good old rudder-only! On to the fray!

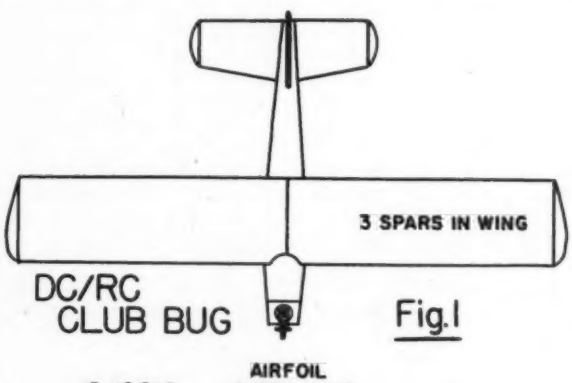
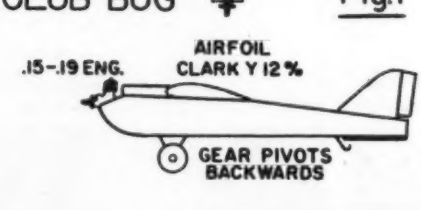


Fig.1



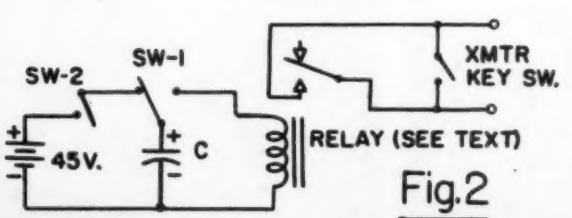
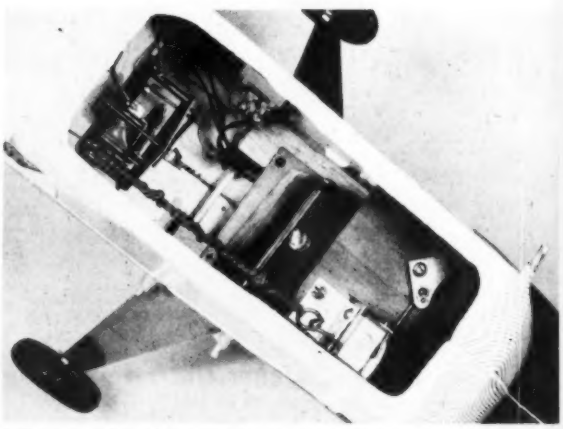


Fig.2



Boiler-room shot showing Babcock Mark 2 escapement on rudder, Citizen-Ship on motor, via bellcrank. R'cvr board screws on runners.

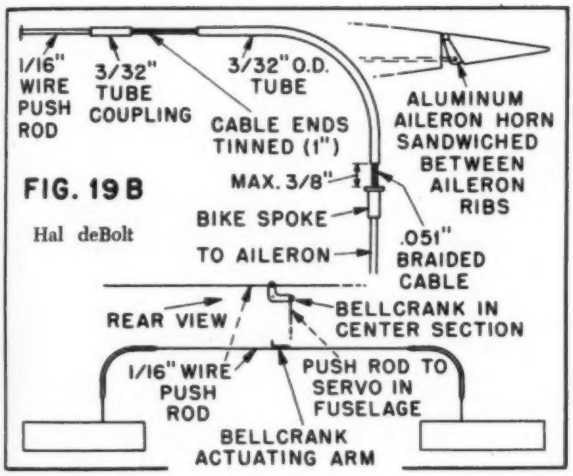
TECHNICAL TOPICS

► Speaking of superhets it should be pointed out that Mr. Leonard Chioma, 2020 Natalen Road, Winter Park, Fla. was the first in this country to develop a superhet for model work. Sold some years ago, this type circuitry offered few advantages at the time; however, credit is due Mr. Chioma. Incidentally, the price of his 3" x 5" model was $49.50, for either CW or tone.

And now we hear from Mr. David W. McQue, 6 Laburnum Grove, Bletchley, Bucks, England about his superhets. His tube sets were designed primarily for model aircraft and were used in 5-foot planes, weighing four pounds. Hill-soaring flights of one hour are common. The 1-pound battery load is good for 6-7 hours continuous operation. The English band is 26.960mc to 27.280mc, divided into 11 channels, about 30kc apart. Up to six planes have been in the air at one time using this type receiver.

The IF frequency is 465kc. Reflexing of the IF amplifier as an RF amplifier was used as a means of preventing radiation. Mr. McQue completed a successful 11-transistor superhet over a year ago. It operates from four of the Magna-Lux cells (eight volts), idles at 6 ma. When used with a reed bank, the current increases to 10ma. Eight additional transistors can replace the relays in a 4-channel reed setup. His late model transistorized receivers use a diode mixer which does not overload at close range. A two diode mixer (balanced) is used to reduce local oscillator radiation. Cascaded IF's produce a stable amplifier without fiddling or need for neutralization. One of the latest

Power supply (2 and 6 volts regulated, non-regulated by Gyro), eliminates B batteries in transmitter. Output is 135-180 volts.



McQue receivers weighs 4¾ ounces and operates from 7.5 to 9 volts. Ground range is 1/3 mile with but 40 milliwatts into an 8½-foot antenna. He considers the use of filters to obtain selectivity impractical. The effects of loading the super-regen are out of this world and the amount of screening and shielding that would have to be done makes it all the more impractical.

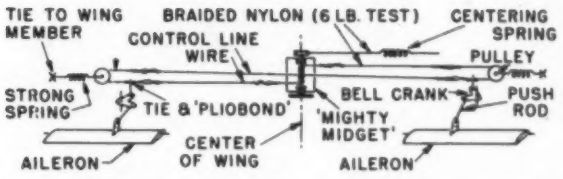
• • •

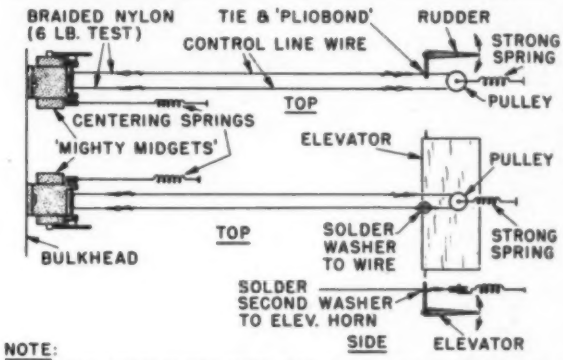
Warning! When sanding fiberglass, fine particles of glass float in the air and can get into your lungs. One of the top modelers in our area experienced this problem. Do your sanding outdoors or in an area of good ventilation or wear a mask. A simple mask can be obtained at most drugstores.

• • •

Several inquiries have been made regarding the suitability of certain pieces of 465mc surplus gear (advertised in model magazines) for RC work. As far as we know, there is NO 465mc surplus gear that is legal for our use. The T49F AMTZ Transmitter operates on 440-480mc. Even though 465mc falls in the middle of the operating frequency, this unit has NOT been approved for RC use and, not being Type Approved, is illegal.

While on the subject of illegal operation we've mentioned before, that merely changing to a closer tolerance crystal does not guarantee the correct output frequency. This is especially true when using a high-powered oscillator transmitter. Most MOPA units will present no trouble in this respect.

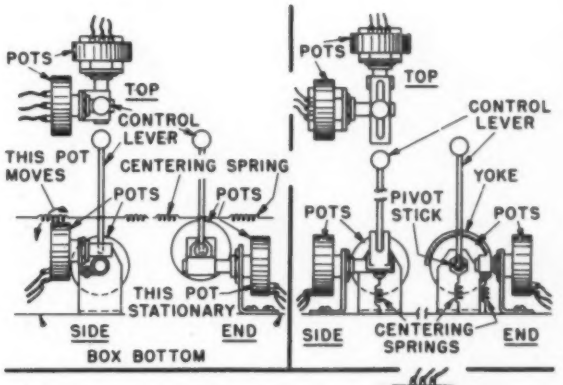


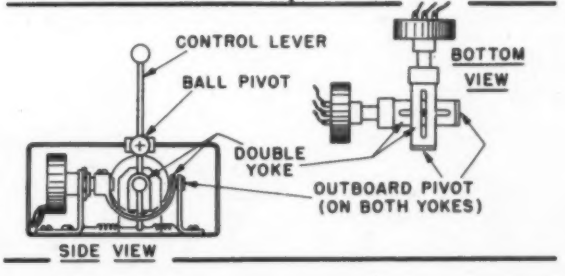


NOTE:

ELEVATOR HORN PLUGS INTO WASHER WHICH IS SOLDERED TO WIRE. 7 TURNS OF NYLON LINE AROUND THE 1/16" DIA. SECONDARY SHAFT ON 'MIGHTY MIDGET.' CENTER WRAP IS GLUED TO SHAFT WITH 'PLIOBOND.' BRONZE BEARINGS ARE RECOMMENDED FOR 1/16" OUTPUT SHAFT OF 'MIGHTY MIDGET.'

DC-RC Newsletter, Jim Reed's "geared down" MM motors for rudder, ailerons, elevators. Two VO-800's, plus silvercell for each side of servo eliminates much of the wiggling in the dual proportional.

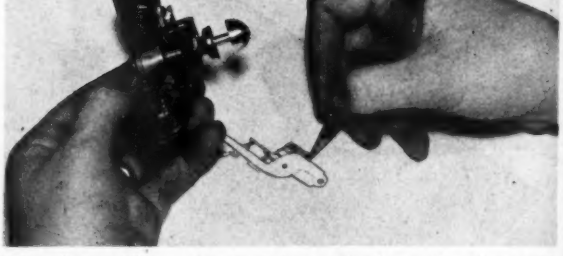




DC-RC Newsletter: Three systems for mounting pots, stick, for dual proportional, Simpl-Simul. Top, L—One pot on shaft of other; Top, R—Both pots on control box; Above—Austermann double-yoke system.

The DC/RC Club-Bug (Fig. 1) was designed by Fred Warnock and Dr. Reg Mitchell to lessen the high mortality rate of models built by inexperienced fliers. This is a rugged model with a span of 56" and a Clark Y 12% airfoil. Plenty of sheet wood and blocks make it easy to build, Control may be by proportional (*Continued on page* 34)

A thorough scrubbing with a toothbrush of all the parts after an all-night soak in solvent—bath frequently loosens stuck piston.



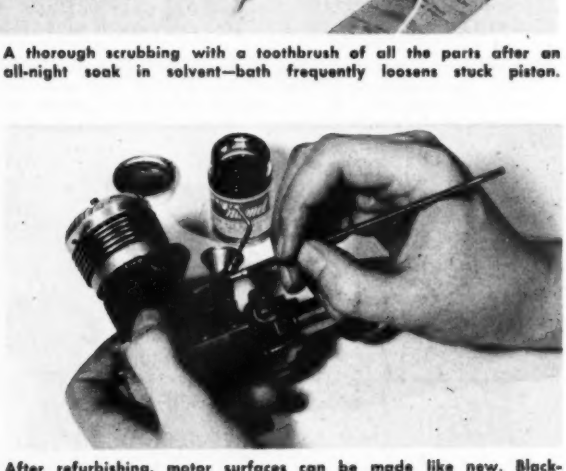
When disassembling a strange design, a sketch may help later with reassembly. Here, author sketches timer assembly of pre-war Atom.

I collect old Engines

Part Two

by WALLACE R. MacLAREN

Finding an antique motor is the collector's big thrill but restoring the mill to running order and top notch appearance is the real pay-off. Not always easy.



After refurbishing, motor surfaces can be made like new. Blackened fins, boiled in detergent, scrubbed, rinsed, oiled, rubbed.

Twenty-seven years in engines, from the Brown Jr. to Oliver Tiger, of all sizes and nationalities. Clunks and bombs, all valuable.

► To a collector, finding an old or unusual motor is usually only half the battle. It remains to recondition them to their original state, or as near to that as possible. Engines may require considerable "face lifting." One might have blackened cylinder fins and several missing parts; another a badly corroded crankcase or a "frozen" piston; or be almost unrecognizable through a 20-year layer of dirt, dope and dust. By expending very little effort, such motors can be put in excellent running condition.

Dirt is the nemesis of the model airplane motor. It has not only ruined hundreds of motors but it can render an otherwise serviceable engine completely useless. Therefore, it should come as no surprise that the most important phase of reconditioning old motors is a good, healthy bath. This also applies to engines which, although new, have been sitting on a dealer's shelf for several years.

Much of the following procedure can prove invaluable even if you don't collect motors. We should also explain that we are not talking about *re-building* which is, in itself, quite a topic. We will assume that your motor is in at least "fair" running condition, since most modelers don't have access to machine shop facilities or hesitate to hack away with a Swiss file.

The tools required for reconditioning are simple, including the usual screwdrivers, wrenches and razor blades. In addition, obtain a fairly stiff toothbrush, a few pieces of #400 wet-or-dry sandpaper and some light rubbing compound. Oh yes, and a good brand of penetrating oil. We prefer "3 in 1."

All set? Begin by laying down some newspaper or clean paper towels on which to work. Then carefully disassemble the motor, starting with extraneous parts such as prop nut and washers, timer, gas tank, plug, etc. Be sure to use the correct type and size of screwdriver because you may not be able to replace those machine screws. If you are not too familiar with the motor's design, it may help to sketch certain parts (such as the timer assembly) as you go along. This will assure you of getting all the parts stuffed back in place and will prevent the usual faux pas of reassembling the cylinder or piston backwards. If the piston is reluctant to leave the cylinder, don't use a nail set and a hammer to loosen it. It may free up in the bath. Pressed-in liners and ball bearings can be removed by heating the cylinder block in the oven for a few minutes. They should just drop out once the aluminum has expanded. Always try to preserve the original gaskets, but if you can't, don't worry about it.

When your motor is fully disassembled, place the parts in a large jar or some other container. Then add enough solvent to completely cover them. You can use white gas, denatured alcohol or an unleaded gasoline like Blue Sunoco. We've been using the latter for years since it's readily available and does as good a cleaning job as anything else. Let the parts soak (overnight, if possible) and then scour them with the toothbrush. Be sure to scrub *everything*, including the slots of the screws. When you are satisfied with the cleanliness of a part, lay it aside on a newspaper. Finally, re-wash all parts in some clean gasoline.

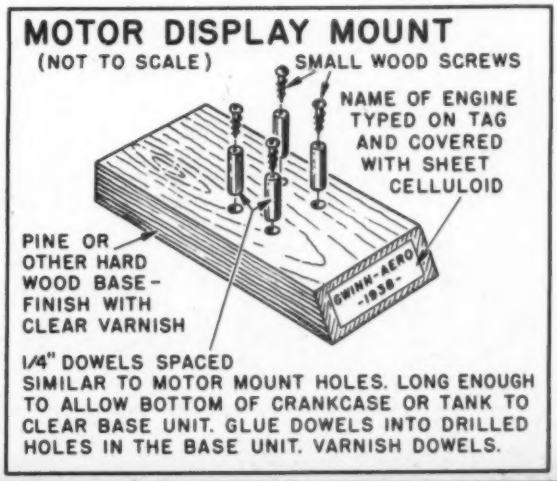
Most engines with considerable running time have blackened cylinder heads or fins. This carbon, in most cases, cannot be removed with gasoline. Instead, boil the part in equal parts of water and any good wash day detergent like Tide or Wisk. Five minutes should be ample time. Remove the part and, while it's still warm, go over it with the toothbrush and hot, soapy water. Then rinse it off and coat lightly with oil. Occasionally, a cylinder head subjected to this treatment will dull. Rubbing compound quickly restores the lustre.

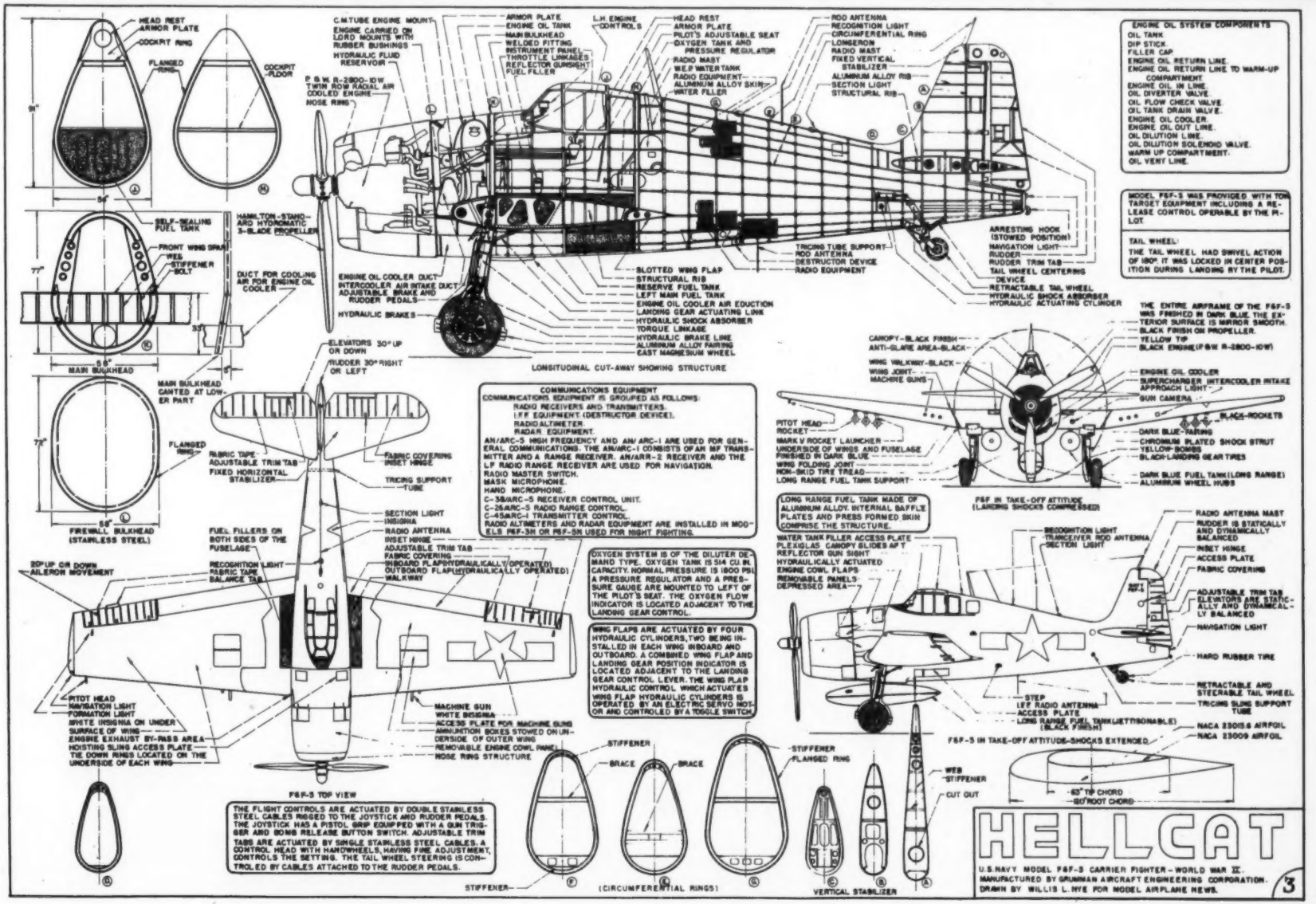
Before we put the motor together again, there are several other small details to attend to. Screw heads can be lightly filed and then sanded with #400 sandpaper to make them more presentable. (*Continued on page* 38)

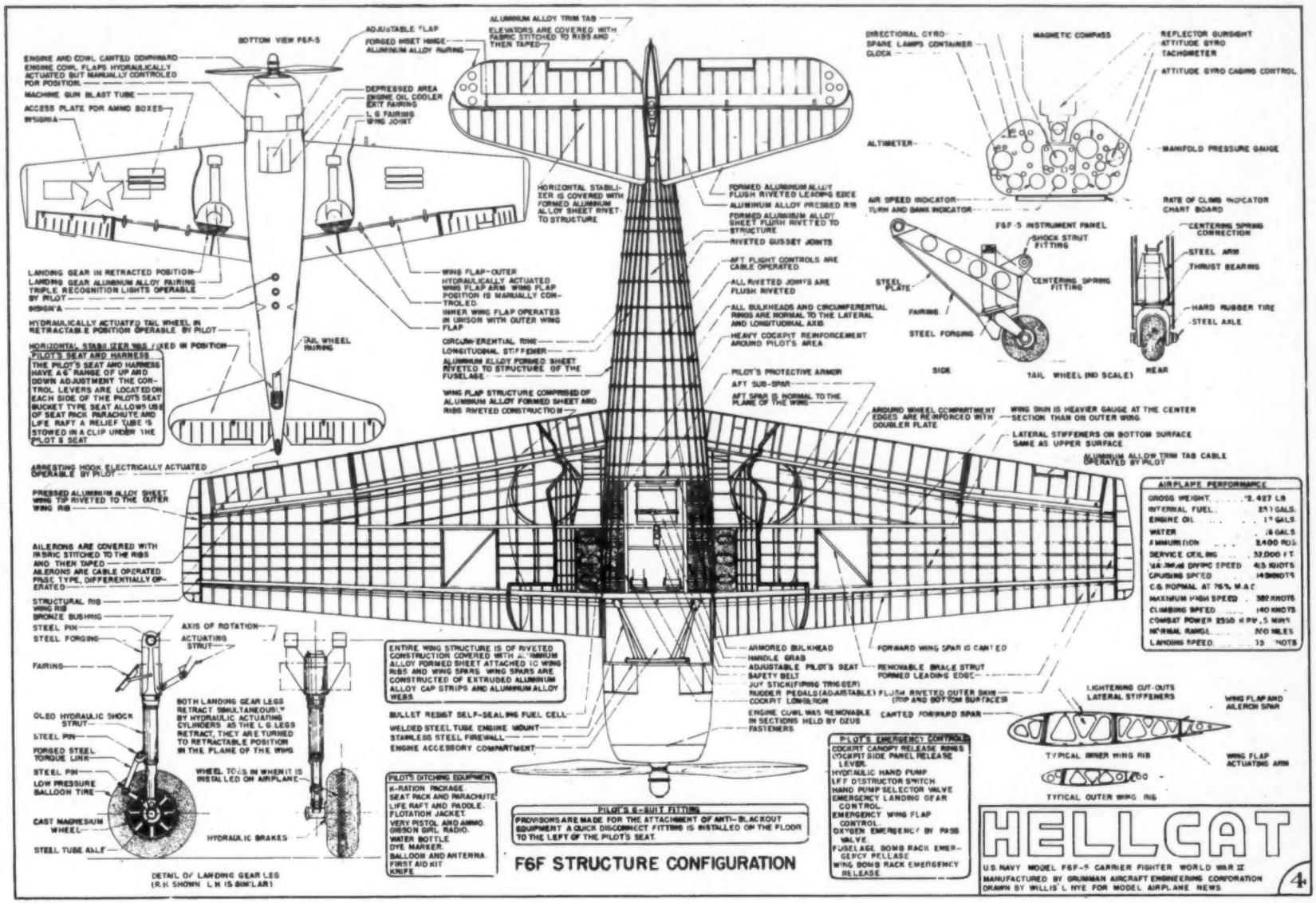
Cracks—even broken lugs—can be repaired with Plastic Aluminum. Can be filed, drilled, sanded, usually duplicates original metal.

Old engines plagued with bent fins, straightened with screw driver. Aged mills, especially magnesium castings, become brittle with time.

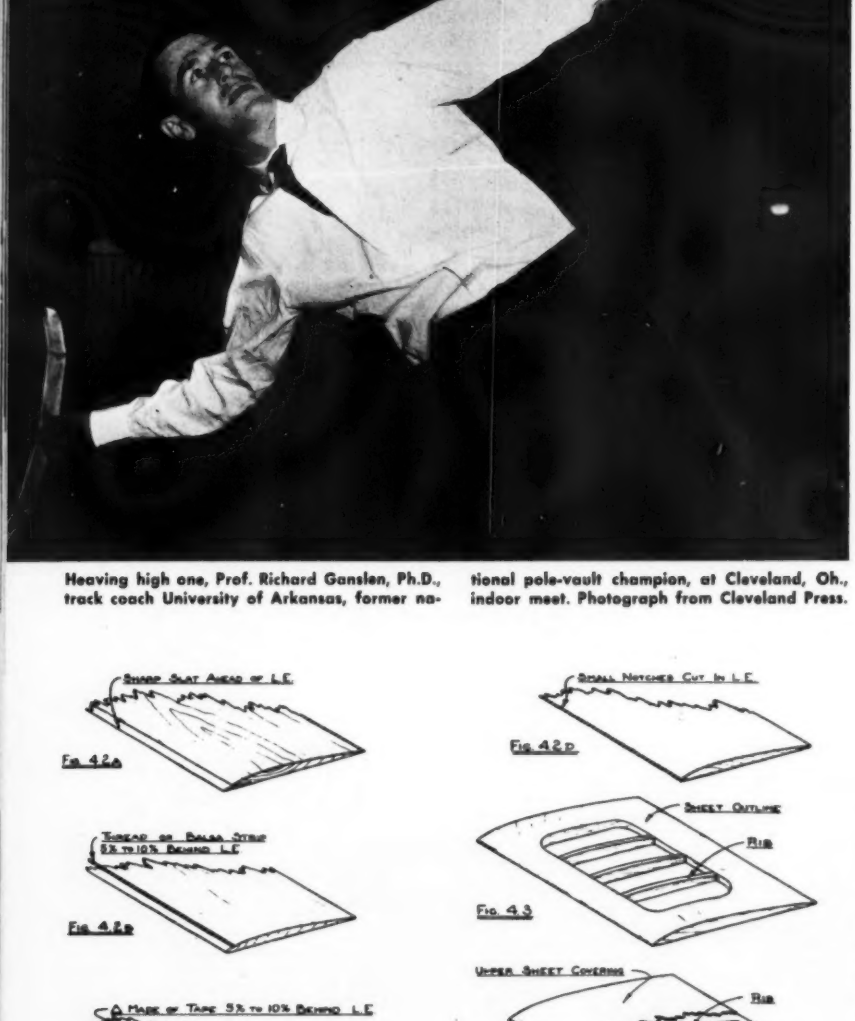
Mounting block can be made from wood, plexiglass. Radial mounts attach to vertical piece instead of dowels. Glass door cabinet?


MOTOR DISPLAY MOUNT
(NOT TO SCALE)
SMALL WOOD SCREWS
NAME OF ENGINE TYPED ON TAG AND COVERED WITH SHEET CELLULOID
PINE OR OTHER HARD WOOD BASE - FINISH WITH CLEAR VARNISH
GWINN-AERO -1938-
1/4" DOWELS SPACED SIMILAR TO MOTOR MOUNT HOLES. LONG ENOUGH TO ALLOW BOTTOM OF CRANKCASE OR TANK TO CLEAR BASE UNIT. GLUE DOWELS INTO DRILLED HOLES IN THE BASE UNIT. VARNISH DOWELS.


HELLCAT
U.S. NAVY MODEL F6F-3 CARRIER FIGHTER - WORLD WAR II.
MANUFACTURED BY GRUMMAN AIRCRAFT ENGINEERING CORPORATION.
DRAWN BY WILLIS L. NYE FOR MODEL AIRPLANE NEWS.
3
LONGITUDINAL CUT-AWAY SHOWING STRUCTURE
F6F-3 TOP VIEW
F6F IN TAKE-OFF ATTITUDE (LANDING SHOCKS COMPRESSED)
F6F-3 IN TAKE-OFF ATTITUDE-SHOCKS EXTENDED
ENGINE OIL SYSTEM COMPONENTS
OIL TANK
DIP STICK
FILLER CAP
ENGINE OIL RETURN LINE.
ENGINE OIL RETURN LINE TO WARM-UP COMPARTMENT.
ENGINE OIL IN LINE.
OIL DIVERTER VALVE.
OIL FLOW CHECK VALVE.
OIL TANK DRAIN VALVE.
ENGINE OIL COOLER.
ENGINE OIL OUT LINE.
OIL DILUTION LINE.
OIL DILUTION SOLENOID VALVE.
WARM UP COMPARTMENT.
OIL VENT LINE.
MODEL F6F-3 WAS PROVIDED WITH TOW TARGET EQUIPMENT INCLUDING A RELEASE CONTROL OPERABLE BY THE PILOT.
TAIL WHEEL:
THE TAIL WHEEL HAD SHIVEL ACTION OF 180°. IT WAS LOCKED IN CENTER POSITION DURING LANDING BY THE PILOT.
COMMUNICATIONS EQUIPMENT
COMMUNICATIONS EQUIPMENT IS GROUPED AS FOLLOWS:
RADIO RECEIVERS AND TRANSMITTERS.
IFF EQUIPMENT (DESTRUCTOR DEVICE).
RADIO ALTIMETER.
RADAR EQUIPMENT.
AN/ARC-5 HIGH FREQUENCY AND AN/ARC-1 ARE USED FOR GENERAL COMMUNICATIONS. THE AN/ARC-1 CONSISTS OF AN MF TRANSMITTER AND A RANGE RECEIVER. AN/ARR-2 RECEIVER AND THE LF RADIO RANGE RECEIVER ARE USED FOR NAVIGATION.
RADIO MASTER SWITCH.
MASK MICROPHONE.
HAND MICROPHONE.
C-38/ARC-5 RECEIVER CONTROL UNIT.
C-26/ARC-5 RADIO RANGE CONTROL.
C-45/ARC-1 TRANSMITTER CONTROL.
RADIO ALTIMETERS AND RADAR EQUIPMENT ARE INSTALLED IN MODELS F6F-3N OR F6F-5N USED FOR NIGHT FIGHTING.
OXYGEN SYSTEM IS OF THE DILUTER DEMAND TYPE. OXYGEN TANK IS 514 CU IN. CAPACITY. NORMAL PRESSURE IS 1800 PSI. A PRESSURE REGULATOR AND A PRESSURE GAUGE ARE MOUNTED TO LEFT OF THE PILOT'S SEAT. THE OXYGEN FLOW INDICATOR IS LOCATED ADJACENT TO THE LANDING GEAR CONTROL.
WING FLAPS ARE ACTUATED BY FOUR HYDRAULIC CYLINDERS, TWO BEING INSTALLED IN EACH WING INBOARD AND OUTBOARD. A COMBINED WING FLAP AND LANDING GEAR POSITION INDICATOR IS LOCATED ADJACENT TO THE LANDING GEAR CONTROL LEVER. THE WING FLAP HYDRAULIC CONTROL WHICH ACTUATES WING FLAP HYDRAULIC CYLINDERS IS OPERATED BY AN ELECTRIC SERVO MOTOR AND CONTROLED BY A TOGGLE SWITCH.
LONG RANGE FUEL TANK MADE OF ALUMINUM ALLOY. INTERNAL BAFFLE PLATES AND PRESS FORMED SKIN COMPRISE THE STRUCTURE.
THE FLIGHT CONTROLS ARE ACTUATED BY DOUBLE STAINLESS STEEL CABLES RIGGED TO THE JOYSTICK AND RUDDER PEDALS. THE JOYSTICK HAS A PISTOL GRIP EQUIPPED WITH A GUN TRIGGER AND BOMB RELEASE BUTTON SWITCH. ADJUSTABLE TRIM TABS ARE ACTUATED BY SINGLE STAINLESS STEEL CABLES. A CONTROL HEAD WITH HANDWHEELS, HAVING FINE ADJUSTMENT, CONTROLS THE SETTING. THE TAIL WHEEL STEERING IS CONTROLED BY CABLES ATTACHED TO THE RUDDER PEDALS.
THE ENTIRE AIRFRAME OF THE F6F-3 WAS FINISHED IN DARK BLUE. THE EXTERIOR SURFACE IS MIRROR SMOOTH.
BLACK FINISH ON PROPELLER.
YELLOW TIP
BLACK ENGINE (P&W R-2800-10W)
ENGINE OIL COOLER
SUPERCHARGER INTERCOOLER INTAKE
APPROACH LIGHT
GUN CAMERA
BLACK ROCKETS
DARK BLUE FAIRING
CHROMIUM PLATED SHOCK STRUT
YELLOW BOMBS
BLACK LANDING GEAR TIRES
DARK BLUE FUEL TANK (LONG RANGE)
ALUMINUM WHEEL HUBS
CANOPY-BLACK FINISH
ANTI-GLARE AREA-BLACK
WING WALKWAY-BLACK
WING JOINT
MACHINE GUNS
PITOT HEAD
ROCKET
MARK V ROCKET LAUNCHER
UNDERSIDE OF WINGS AND FUSELAGE FINISHED IN DARK BLUE
WING FOLDING JOINT
NON-SKID TIRE TREAD
LONG RANGE FUEL TANK SUPPORT
RADIO ANTENNA MAST
RUDDER IS STATICALLY AND DYNAMICALLY BALANCED
INSET HINGE
ACCESS PLATE
FABRIC COVERING
ADJUSTABLE TRIM TAB
ELEVATORS ARE STATICALLY AND DYNAMICALLY BALANCED
NAVIGATION LIGHT
HARD RUBBER TIRE
RETRACTABLE AND STEERABLE TAIL WHEEL
TRICING SLING SUPPORT TUBE
NACA 23015.6 AIRFOIL
NACA 23009 AIRFOIL
63" TIP CHORD
80" ROOT CHORD
RECOGNITION LIGHT
TRANCEIVER ROD ANTENNA
SECTION LIGHT
WATER TANK FILLER ACCESS PLATE
PLEXIGLAS CANOPY SLIDES AFT
REFLECTOR GUN SIGHT
HYDRAULICALLY ACTUATED ENGINE COWL FLAPS
REMOVABLE PANELS DEPRESSED AREA
STEP
LEF RADIO ANTENNA ACCESS PLATE
LONG RANGE FUEL TANK (JETTISONABLE) (BLACK FINISH)
WEB STIFFENER
CUT OUT
STIFFENER
BRACE
FLANGED RING
(CIRCUMFERENTIAL RINGS)
VERTICAL STABILIZER
HEAD REST
ARMOR PLATE
COCKPIT RING
FLANGED RING
COCKPIT FLOOR
SELF-SEALING FUEL TANK
FRONT WING SPAR
WEB
STIFFENER
BOLT
MAIN BULKHEAD
MAIN BULKHEAD CANTED AT LOWER PART
FLANGED RING
FIREWALL BULKHEAD (STAINLESS STEEL)
C.M. TUBE ENGINE MOUNT
ENGINE CARRIED ON LORD MOUNTS WITH RUBBER BUSHINGS
HYDRAULIC FLUID RESERVOIR
P & W R-2800-10W TWIN ROW RADIAL AIR COOLED ENGINE
NOSE RING
HAMILTON-STANDARD HYDROMATIC 3-BLADE PROPELLER
DUCT FOR COOLING AIR FOR ENGINE OIL COOLER
ENGINE OIL COOLER DUCT
INTERCOOLER AIR INTAKE DUCT
ADJUSTABLE BRAKE AND RUDDER PEDALS
HYDRAULIC BRAKES
ELEVATORS 30° UP OR DOWN
RUDDER 30° RIGHT OR LEFT
FABRIC TAPE
ADJUSTABLE TRIM TAB
FIXED HORIZONTAL STABILIZER
FABRIC COVERING
INSET HINGE
TRICING SUPPORT TUBE
SECTION LIGHT
INSIGNIA
RADIO ANTENNA
INSET HINGE
ADJUSTABLE TRIM TAB
FABRIC COVERING
INBOARD FLAP (HYDRAULICALLY OPERATED)
OUTBOARD FLAP (HYDRAULICALLY OPERATED)
WALKWAY
FUEL FILLERS ON BOTH SIDES OF THE FUSELAGE
RECOGNITION LIGHT
FABRIC TAPE
BALANCE TAB
20° UP OR DOWN AILERON MOVEMENT
PITOT HEAD
NAVIGATION LIGHT
FORMATION LIGHT
WHITE INSIGNIA ON UNDER SURFACE OF WING
ENGINE EXHAUST BY-PASS AREA
HOISTING SLING ACCESS PLATE
TIE DOWN RINGS LOCATED ON THE UNDERSIDE OF EACH WING
MACHINE GUN
WHITE INSIGNIA
ACCESS PLATE FOR MACHINE GUNS
AMMUNITION BOXES STOWED ON UNDERSIDE OF OUTER WING
REMOVABLE ENGINE COWL PANEL
NOSE RING STRUCTURE
STIFFENER
ARMOR PLATE
ENGINE OIL TANK
MAIN BULKHEAD
WELDED FITTING
INSTRUMENT PANEL
THROTTLE LINKAGES
REFLECTOR GUNSIGHT
FUEL FILLER
L.H. ENGINE CONTROLS
HEAD REST
ARMOR PLATE
PILOT'S ADJUSTABLE SEAT
OXYGEN TANK AND PRESSURE REGULATOR
RADIO MAST
W.E.P. WATER TANK
RADIO EQUIPMENT
ALUMINUM ALLOY SKIN
WATER FILLER
ROD ANTENNA
RECOGNITION LIGHT
CIRCUMFERENTIAL RING
LONGERON
RADIO MAST
FIXED VERTICAL STABILIZER
ALUMINUM ALLOY RIB
SECTION LIGHT
STRUCTURAL RIB
ARRESTING HOOK (STOWED POSITION)
NAVIGATION LIGHT
RUDDER
RUDDER TRIM TAB
TAIL WHEEL CENTERING DEVICE
RETRACTABLE TAIL WHEEL
HYDRAULIC SHOCK ABSORBER
HYDRAULIC ACTUATING CYLINDER
TRICING TUBE SUPPORT
ROD ANTENNA
DESTRUCTOR DEVICE
RADIO EQUIPMENT
SLOTTED WING FLAP
STRUCTURAL RIB
RESERVE FUEL TANK
LEFT MAIN FUEL TANK
ENGINE OIL COOLER AIR EDUCTION
LANDING GEAR ACTUATING LINK
HYDRAULIC SHOCK ABSORBER
TORQUE LINKAGE
HYDRAULIC BRAKE LINE
ALUMINUM ALLOY FAIRING
CAST MAGNESIUM WHEEL


BOTTOM VIEW F6F-5
ENGINE AND COWL CANTED DOWNWARD
ENGINE COWL FLAPS HYDRAULICALLY ACTUATED BUT MANUALLY CONTROLED FOR POSITION
MACHINE GUN BLAST TUBE
ACCESS PLATE FOR AMMO BOXES
PITOT TUBE
ADJUSTABLE FLAP
FORGED INSET HINGE
ALUMINUM ALLOY FAIRING
DEPRESSED AREA ENGINE OIL COOLER EXIT FAIRING
L.G. FAIRING
WING JOINT
ALUMINUM ALLOY TRIM TAB
ELEVATORS ARE COVERED WITH FABRIC STITCHED TO RIBS AND THEN TAPED
HORIZONTAL STABILIZER IS COVERED WITH FORMED ALUMINUM ALLOY SHEET RIVETED TO STRUCTURE
LANDING GEAR IN RETRACTED POSITION
LANDING GEAR ALUMINUM ALLOY FAIRING
TRIPLE RECOGNITION LIGHTS OPERABLE BY PILOT
PITOT TUBE
HYDRAULICALLY ACTUATED TAIL WHEEL IN RETRACTABLE POSITION OPERABLE BY PILOT
HORIZONTAL STABILIZER WAS FIXED IN POSITION
TAIL WHEEL FAIRING
WING FLAP-OUTER
HYDRAULICALLY ACTUATED WING FLAP ARM WING FLAP POSITION IS MANUALLY CONTROLED
INNER WING FLAP OPERATES IN UNISON WITH OUTER WING FLAP
CIRCUMFERENTIAL RING
LONGITUDINAL STIFFENER
ALUMINUM ALLOY FORMED SHEET RIVETED TO STRUCTURE OF THE FUSELAGE
WING FLAP STRUCTURE COMPRISED OF ALUMINUM ALLOY FORMED SHEET AND RIBS RIVETED CONSTRUCTION
FORMED ALUMINUM ALLOY FLUSH RIVETED LEADING EDGE
ALUMINUM ALLOY PRESSED RIB
FORMED ALUMINUM ALLOY SHEET FLUSH RIVETED TO STRUCTURE
RIVETED GUSSET JOINTS
AFT FLIGHT CONTROLS ARE CABLE OPERATED
ALL RIVETED JOINTS ARE FLUSH RIVETED
ALL BULKHEADS AND CIRCUMFERENTIAL RINGS ARE NORMAL TO THE LATERAL AND LONGITUDINAL AXIS
HEAVY COCKPIT REINFORCEMENT AROUND PILOT'S AREA
PILOT'S PROTECTIVE ARMOR
AFT SUB-SPAR
AFT SPAR IS NORMAL TO THE PLANE OF THE WING
PILOT'S SEAT AND HARNESS
THE PILOT'S SEAT AND HARNESS HAVE A 6" RANGE OF UP AND DOWN ADJUSTMENT THE CONTROL LEVERS ARE LOCATED ON EACH SIDE OF THE PILOTS SEAT BUCKET TYPE SEAT ALLOWS USE OF SEAT PACK PARACHUTE AND LIFE RAFT A RELIEF TUBE IS STOWED IN A CLIP UNDER THE PILOT'S SEAT
ARRESTING HOOK ELECTRICALLY ACTUATED OPERABLE BY PILOT
PRESSED ALUMINUM ALLOY SHEET WING TIP RIVETED TO THE OUTER WING RIB
AILERONS ARE COVERED WITH FABRIC STITCHED TO THE RIBS AND THEN TAPED
AILERONS ARE CABLE OPERATED, FRISE TYPE, DIFFERENTIALLY OPERATED
STRUCTURAL RIB
WING RIB
BRONZE BUSHING
STEEL PIN
STEEL FORGING
FAIRING
AXIS OF ROTATION
ACTUATING STRUT
OLEO HYDRAULIC SHOCK STRUT
STEEL PIN
FORGED STEEL TORQUE LINK
STEEL PIN
LOW PRESSURE BALLOON TIRE
CAST MAGNESIUM WHEEL
STEEL TUBE AXLE
BOTH LANDING GEAR LEGS RETRACT SIMULTANEOUSLY BY HYDRAULIC ACTUATING CYLINDERS AS THE L.G. LEGS RETRACT, THEY ARE TURNED TO RETRACTABLE POSITION IN THE PLANE OF THE WING
WHEEL TOES IN WHEN IT IS INSTALLED ON AIRPLANE
HYDRAULIC BRAKES
DETAIL OF LANDING GEAR LEG
(R.H. SHOWN L.H. IS SIMILAR)
ENTIRE WING STRUCTURE IS OF RIVETED CONSTRUCTION COVERED WITH ALUMINUM ALLOY FORMED SHEET ATTACHED TO WING RIBS AND WING SPARS. WING SPARS ARE CONSTRUCTED OF EXTRUDED ALUMINUM ALLOY CAP STRIPS AND ALUMINUM ALLOY WEBS.
BULLET RESIST SELF-SEALING FUEL CELL
WELDED STEEL TUBE ENGINE MOUNT
STAINLESS STEEL FIREWALL
ENGINE ACCESSORY COMPARTMENT
ENGINE COWL WAS REMOVABLE IN SECTIONS HELD BY DZUS FASTENERS
ARMORED BULKHEAD
HANDLE GRAB
ADJUSTABLE PILOT'S SEAT
SAFETY BELT
JUV STICK-FIRING TRIGGER
RUDDER PEDALS (ADJUSTABLE)
COCKPIT LONGERON
CANTED FORWARD SPAR
FORWARD WING SPAR IS CANTED
REMOVABLE BRACE STRUT FORMED LEADING EDGE
FLUSH RIVETED OUTER SKIN (TOP AND BOTTOM SURFACES)
PILOT'S DITCHING EQUIPMENT
K-RATION PACKAGE
SEAT PACK AND PARACHUTE
LIFE RAFT AND PADDLE
FLOTATION JACKET
VERY PISTOL AND AMMO
GIBSON GIRL RADIO
WATER BOTTLE
DYE MARKER
BALLOON AND ANTENNA
FIRST AID KIT
KNIFE
PILOT'S G-SUIT FITTING
PROVISIONS ARE MADE FOR THE ATTACHMENT OF ANTI-BLACKOUT EQUIPMENT A QUICK DISCONNECT FITTING IS INSTALLED ON THE FLOOR TO THE LEFT OF THE PILOT'S SEAT.
PILOT'S EMERGENCY CONTROLS
COCKPIT CANOPY RELEASE RING
COCKPIT SIDE PANEL RELEASE LEVER
HYDRAULIC HAND PUMP
LFF DISTRUCTOR SWITCH
HAND PUMP SELECTOR VALVE
EMERGENCY LANDING GEAR CONTROL
EMERGENCY WING FLAP CONTROL
OXYGEN EMERGENCY BY PASS VALVE
FUSELAGE BOMB RACK EMERGENCY RELEASE
WING BOMB RACK EMERGENCY RELEASE
F6F STRUCTURE CONFIGURATION
DIRECTIONAL GYRO
SPARE LAMPS CONTAINER
CLOCK
MAGNETIC COMPASS
REFLECTOR GUNSIGHT
ATTITUDE GYRO
TACHOMETER
ATTITUDE GYRO CASING CONTROL
ALTIMETER
MANIFOLD PRESSURE GAUGE
AIR SPEED INDICATOR
TURN AND BANK INDICATOR
RATE OF CLIMB INDICATOR
CHART BOARD
F6F-5 INSTRUMENT PANEL
SHOCK STRUT FITTING
CENTERING SPRING FITTING
STEEL PLATE
FAIRING
STEEL FORGING
SIDE
TAIL WHEEL (NO SCALE)
CENTERING SPRING CONNECTION
STEEL ARM
THRUST BEARING
HARD RUBBER TIRE
STEEL AXLE
REAR
AROUND WHEEL COMPARTMENT EDGES ARE REINFORCED WITH DOUBLER PLATE
WING SKIN IS HEAVIER GAUGE AT THE CENTER SECTION THAN ON OUTER WING
LATERAL STIFFENERS ON BOTTOM SURFACE SAME AS UPPER SURFACE
ALUMINUM ALLOY TRIM TAB CABLE OPERATED BY PILOT
LIGHTENING CUT-OUTS
LATERAL STIFFENERS
WING FLAP AND AILERON SPAR
TYPICAL INNER WING RIB
WING FLAP ACTUATING ARM
TYPICAL OUTER WING RIB
AIRPLANE PERFORMANCE
GROSS WEIGHT ..... 12,427 LB
INTERNAL FUEL ..... 251 GALS.
ENGINE OIL ..... 17 GALS
WATER ..... 18 GALS
AMMUNITION ..... 2400 RDS
SERVICE CEILING ..... 37,000 FT
MAXIMUM DIVING SPEED ..... 413 KNOTS
CRUISING SPEED ..... 145 KNOTS
C.G. NORMAL AT 76% M.A.C.
MAXIMUM HIGH SPEED ..... 380 KNOTS
CLIMBING SPEED ..... 140 KNOTS
COMBAT POWER 2550 H.P. @ 5 MINS
NORMAL RANGE ..... 870 MILES
LANDING SPEED ..... 73 KNOTS
HELLCAT
U.S. NAVY MODEL F6F-5 CARRIER FIGHTER WORLD WAR II
MANUFACTURED BY GRUMMAN AIRCRAFT ENGINEERING CORPORATION
DRAWN BY WILLIS L. NYE FOR MODEL AIRPLANE NEWS
4

This is the last of two installments of the most authentic plans drawn to this date.

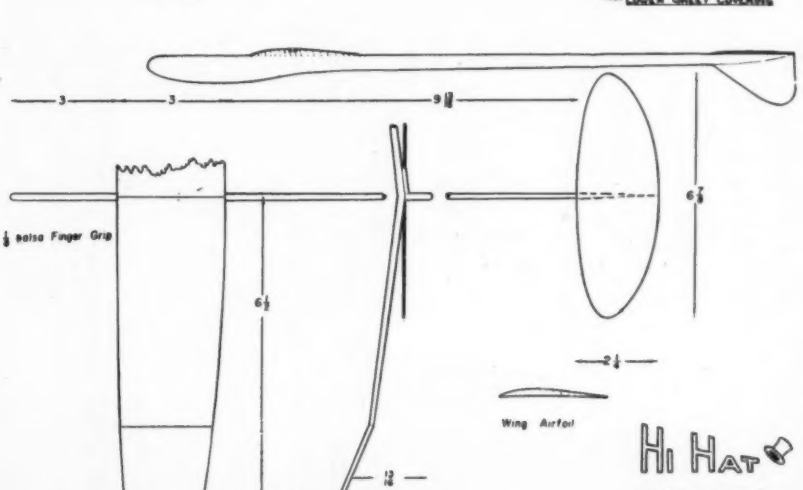


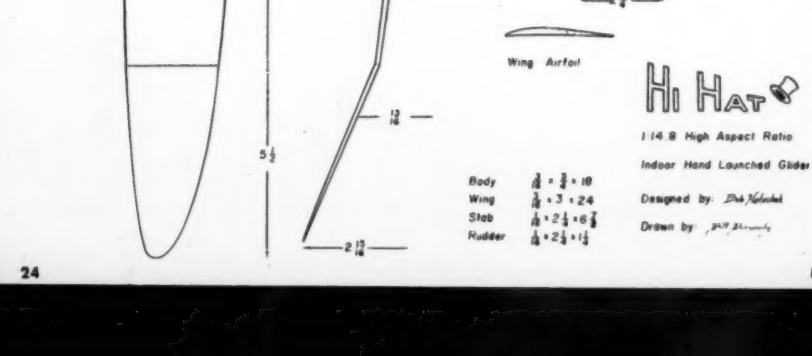
Heaving high one, Prof. Richard Ganslen, Ph.D., track coach University of Arkansas, former national pole-vault champion, at Cleveland, Oh., indoor meet. Photograph from Cleveland Press.

the hand launched glider

by WILLIAM DUNWOODY

Has the toss glider reached its peak? Not at all, says this champion in the fourth and final article of a fascinating, useful series.





► Having covered most of the basic elements of hand-launched glider building and flying in the previous articles, let's take a look into some of the refinements which can be used to make the gliders fly better.

One of the first things a modeler with a good throwing arm will discover is that a zero-zero glider recovers from his launch before the glider's speed has been expended, sometimes stalling at the height of the climb. The quick fix for this condition is to warp the trailing edge of the stabilizer down or to cut down the stabilizer area. In designing the glider, more subtle ways can be found to lick this problem. One is to use a lifting airfoil on the stabilizer which will affect a quick recovery at the top of a powerful launch. Positive incidence built into the stabilizer will also produce a smooth recovery, resulting in a somewhat wider climb turn and a wider flight pattern than the lifting stabilizer will give. The transition from climb to glide is less abrupt with the incidence cure. Care must be taken to avoid overloading it with either method. It can be compared with trying to see how far out a window you can lean; even a little too much is disastrous. Very little positive incidence is needed, about 1/8" per foot being the maximum allowable and about half that amount being normal. *Never*

FIG. 4.7 - OUTSTANDING GLIDERS OF THE LAST TEN YEARS

DESIGNER	OFFICIAL TIME	-WING- AREA	SPAN	A.R.[1]	-STABILIZER- AREA	%	T.V.C.[2]	LENGTHS NOSE	GAP[3]	CHORD	-WEIGHT- OZ.	W/A[4]	K[5]	DIHED.[6]	WING AIRFOIL THICKNESS	SHAPE[7]	STAB. AIRFOIL[8]	SOURCE OF DATA
DUNWOODY '57	77.4	50.0	16.2	5.45	14.2	28.4	1.09	3.6	9.9	3 9	0.72	1.44	57.8	2.2	.25	C	L	DESIGNER
HINES '57	77.2	56.0	16.2	4.7	14.7	26.2	1.02	4.0	9.5	4 0	0.75	1.34	63.6	1.6	.18	U	S	ZAIC '58 Y'BOOK.
DAGAND '54	76.4	52.5	16.5	4.82	14.4	25.5	0.95	3.6	9.8	4 0	0.90	1.59	54.8	2.1	.18	C		ZAIC '56 Y'BOOK.
JOHNSON '57	76.2	56.9	17.5	5.38	15.2	26.7	0.96	4.5	9.0	3.5	0.76	1.34	64.4	1.9	.25	C	L	DESIGNER
HATSCHEK '58	74.8	56.8	24.0	10.1	11.8	20.8	0.85	3.0	9.8	3.0	0.78	1.37	67.0	2.9	.19	T	L	DESIGNER
JOHNSON '55	74.2	58.4	17.0	4.95	15.2	26.0	0.90	3.8	9.0	3.8	0.76	1.30	66.0	1.9	.18	C	L	DESIGNER
FOSTER '52	74.0	61.1	17.0	4.73	15.1	24.7	0.89	4.5	10.0	4.0	0.70	1.14	71.6	1.8	.25	T	S	ZAIC '53 Y'BOOK.
DUNWOODY '54	73.6	61.9	17.0	4.67	17.4	28.1	0.95	5.0	9.4	4.0	0.80	1.29	68.3	1.8	.18	T	S	DESIGNER
DEMOS '49	72.0	56.6	17.0	5.10	15.8	27.9	0.99	5.2	8.9	3.9	0.75	1.32	64.3	1.9	.25	C	S	MOD. AIR. NEWS
SAVAGE '55	70.0	59.8	17.0	4.83	14.6	24.4	0.87	4.8	9.5	4.0	0.65	1.09	72.5	1.8	.25			ZAIC '56 Y'BOOK.
BLOCK '55	69.4	54.4	16.0	4.71	14.6	26.8	0.97	3.8	9.4	4.0	0.78	1.44	60.8	1.9	.18			M.A.N. 12/55
DOMIZI '55	68.9	48.0	17.0	6.0	11.0	22.9	1.03	4.5	10.2	3.0	0.53	1.11	63.6	1.8	.18		S	DESIGNER
HATSCHEK '57	68.0	65.0	24.0	8.9	12.0	18.5	0.84	4.5	10.0	3.0	0.88	1.35	68.8	2.4	.25	T	L	DESIGNER
BILGRI '48	67.0	63.4	18.0	5.11	21.1	33.4	1.04	5.0	8.0	4.0				2.0	.25		S	A.T. 9/52
STEVENS '55	66.6	51.3	16.0	5.0	10.2	20.0	0.73	4.2	9.0	3.5	0.63	1.27	63.1		.18			A.T. ANNUAL '56

NOTES: (1) - A.R. = $\frac{\text{SPAN}}{\text{AVER. CHORD}} = \frac{\text{SPAN}^2}{\text{AREA}}$

(2) - T.V.C. = STAB. AREA x MOMENT ARM/WING AREA x WING CHORD.

(3) - GAP = DISTANCE FROM WING T.E. TO STABILIZER L.E.

(4) - W/A = WEIGHT/100 SQ. IN. AREA

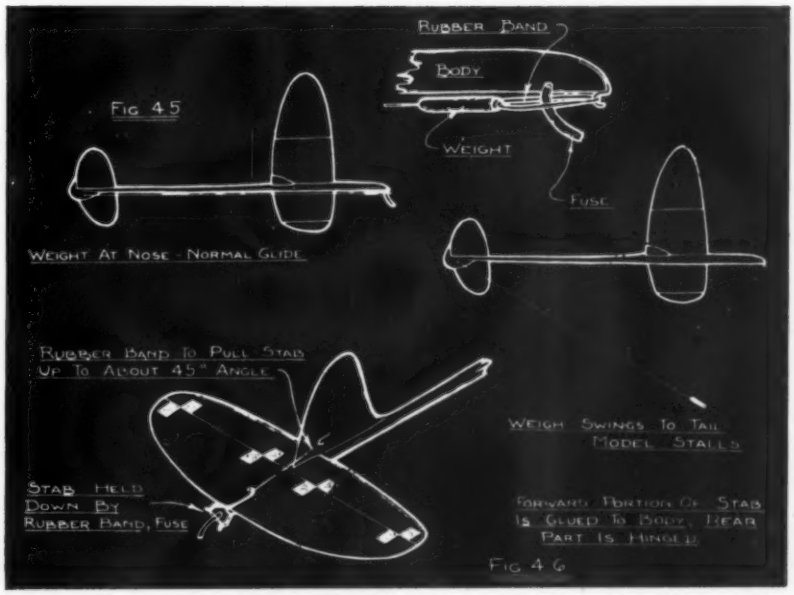
(5) - K = AREA/WEIGHT$^{2/3}$

(6) - MEASURED AT TIP. ALL ARE POLYHEDRAL EXCEPT DAGAND, WHICH IS "V" DIHEDRAL.

(7) - C = CURVED AIRFOIL SECTION
U = UNDERCAMBERED SECTION
T = TRIANGULAR SECTION

(8) - L = LIFTING SECTION
S = SYMMETRICAL SECTION

DRAWN BY PAUL PLEGAN


RUBBER BAND
BODY
FIG 4.5
WEIGHT
FUSE
WEIGHT AT NOSE - NORMAL GLIDE
RUBBER BAND TO PULL STAB UP TO ABOUT 45° ANGLE
WEIGH SWINGS TO TAIL MODEL STALLS
STAB HELD DOWN BY RUBBER BAND, FUSE
FORWARD PORTION OF STAB IS GLUED TO BODY, REAR PART IS HINGED
FIG 4.6

couple a lifting stabilizer with positive incidence.

In an effort to obtain better indoor performance, I have cut down the amount of dihedral used to 1¼" on a 17" span glider. This led to difficulties far outweighing what little improvement was obtained in the glide. The recovery from climb to glide suffered greatly. The symptoms of this trouble are very much the same as those described above, but the cures recommended there would prove disastrous. Adding a high forward fin and a low sub-rudder might help, but the only real fix is to increase the dihedral. The amount of dihedral given in the chart in Part I should be adequate for all conditions without injuring performance. It might be pointed out here that some underslung rudder is useful beyond increasing stability—it helps prevent damage to the stabilizer in landings.

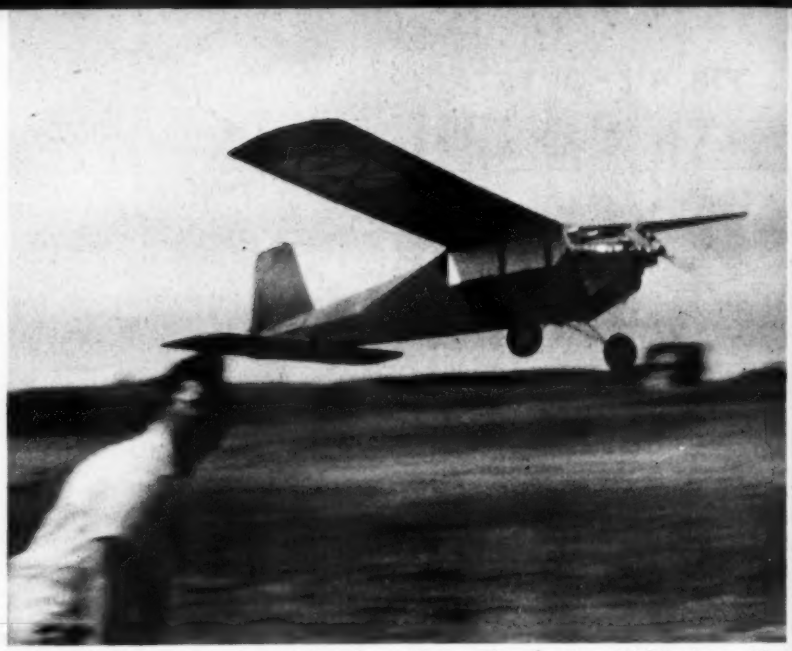
Ways of improving glide performance provide excellent fields for experimentation. Bob Hatschek has turned in excellent times indoors with a high aspect ratio wing (about 10:1, double the A.R. used on most gliders), shown in figure 4.1. Present trends seem to point toward this as an excellent way of raising flight times. Structural problems are most annoying in such a glider; the great speed during launching causes flutter and bending of the wing, often resulting in a wrecked glider. Part of the solution to this problem is to perfect a smoother launch but careful selection of wood is the key to a rugged high aspect ratio wing.

High aspect ratio wings have a smaller volume of wood in them than do lower aspect ratio wings. This permits the use of heavier wood without increasing the weight of the glider. It is very necessary to taper the thickness of high aspect ratio wings in order to distribute the loads encountered in launching evenly along the wing. Wings with aspect ratios higher than 10:1 can be launch with full power if properly built.

Turbulators (figure 4.2) have been tried on hand launched gliders by many modelers with varying degrees of success but much more experimentation is needed, (*Continued on page* 53)

For those who ask how to get started in RC, here's one man's story. It began with dreams of a wheeling DC-6—but a happy ending.

(Editor's Note—Biggest reader problem in RC today—is that of getting started. MAN is not reluctant to print an occasional getting-started RC article, nor does it care what make of equipment or plane you used, provided it worked! Alas, Gramps plans are out of print.)



A how-not-to-do-it article, says author, here launching newly finished model. Shortly after Gramps almost went to old-folks home. After 10 flight initiation, he was off to the races.

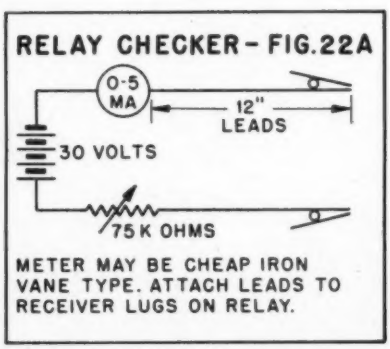
Gramps and I

by PAUL H. SCHAAF, JR.

◄ A U-Control fan from way back, I had never received that extra spark to get me started in RC. When I came across the Gramps plans in the January 1957 MAN it must have titillated the right nerve, because about 20 minutes later I had sent away for the full-size plan. This was it—now or never.

I realized that RC was far more involved than U-Control and some planning was necessary to keep my initial investment within reason and yet enable me to acquire sufficient equipment to enjoy the sport with a minimum of snafus. Quite naturally I had dreams of a DC-6 wheeling and banking under my control and swooping in for a three-point landing. Good sense prevailed and I decided to proceed slowly and surely as all the advice in MAN stressed. Although I am an engineer, my knowledge of radio was practically zero, and I determined to proceed as logically as possible. The next day I toured the local hobby shop and radio parts store and bought several of the more prominent Model Radio Control books (at end of article). While waiting for the full-size plans of Gramps to arrive, I read through my stockpile of MAN especially concentrating on the radio control articles. Any points which were of particular interest were noted in a notebook for when I was to begin the actual construction.

Finally, I decided on a rudder-only plane, however, to use a compound escapement so that motor control could be added at a later date. This, incidentally, was also the set-up for Gramps. Ace Radio Control ads drew my attention, and after some correspondence which was most helpful and informative, I decided to construct the Lorenz MOPA Transmitter utilizing one of their kits. This unit was also featured in the August 1954 issue of MAN which proved of benefit when I started the assembly. By carefully studying the plans and reading and re-reading the instructions, the transmitter was assembled without too much trouble. A few ques- (*Continued on page* 30)


RELAY CHECKER - FIG. 22A
0-5 MA
12" LEADS
30 VOLTS
75 K OHMS
METER MAY BE CHEAP IRON VANE TYPE. ATTACH LEADS TO RECEIVER LUGS ON RELAY.

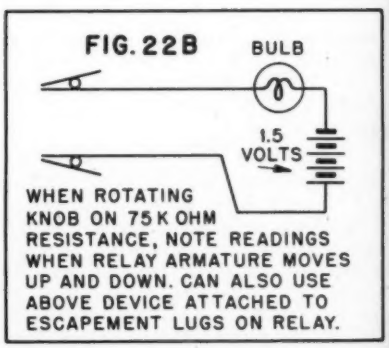


FIG. 22B
BULB
1.5 VOLTS
WHEN ROTATING KNOB ON 75 K OHM RESISTANCE, NOTE READINGS WHEN RELAY ARMATURE MOVES UP AND DOWN. CAN ALSO USE ABOVE DEVICE ATTACHED TO ESCAPEMENT LUGS ON RELAY.

Meter, test-set just like the article said. In Paul's favor was willingness to wade through what the other guys had said. Mother and two little girls shared flying-field ups and downs.

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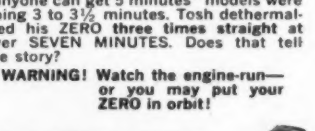
WARNING! Watch the engine-run— or you may put your ZERO in orbit!

A-1 NORDIC GLIDER



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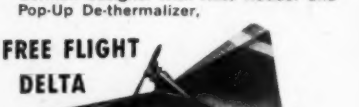

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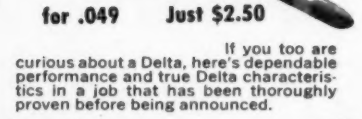

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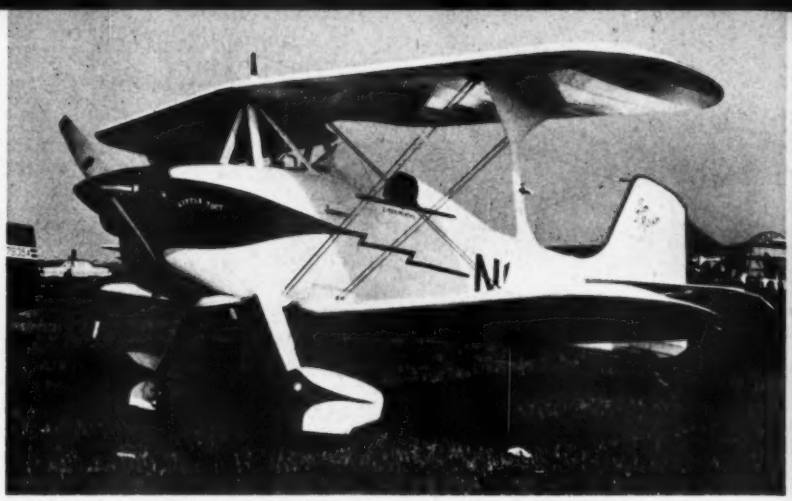


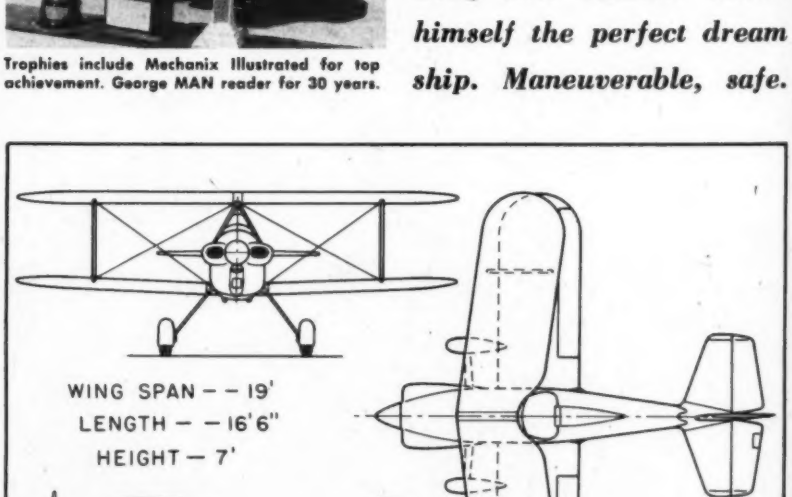
Fully aerobatic baby bipe is world famous. It is powered by 90-hp Continental and has a wing spread of 19 feet. Sweepback in upper wing reminiscent of Great Lakes, the Seahawk!

home built parade

Trophies include Mechanix Illustrated for top achievement. George MAN reader for 30 years.

LITTLE TOOT

Long time modeler builds himself the perfect dream ship. Maneuverable, safe.



On top of the world! Top speed on 90 hp, 127 mph. Meyer would like to install 135-150 hp.

►Outstanding appearance, design, workmanship, and performance have earned George W. Meyer's Little Toot worldwide notoriety. In 1957, it won the Mechanix Illustrated Trophy for outstanding Achievement for Home-Built Aircraft. It won second place for Outstanding Design and second for the longest distance flown to the EAA Fly-In at Milwaukee.

Painted white with red trim, the ship spans a wee 19 feet and is powered with a 90 hp Continental. On this power it tops 127 mph at 2000 feet, climbs at 800 feet per minute. George hopes to install a 130 or 150 hp Continental. Lil T is remarkably maneuverable and stable.

Well, how does it fly? Stall is clean, with plenty of warning, and it resumes flying as soon as pressure is released. Hold it in sustained spins and a very rapid recovery requires only releasing control pressure. No bad characteristics. Stall and landing are 55 mph. Takes off in 200 feet and landing roll is the same. Fully aerobatic, Lil Toot is not capable of sustained inverted flight—only because it doesn't have an inverted fuel system. And man, is it strong! Stressed for ten G's with plenty of beef in all fittings and wires.

Lil T is a modeler's dream ship. George hasn't missed an issue of MAN in 30 years. He still builds—in fact, has an RC Little Toot! Knowing what he wanted in a real flying machine, he came up with a sterling design that, as one would expect, lends itself to modeling.

Meyer believes that any projected homebuilt, should first be built as a model. His model has metal spars and ribs with silk covering. The real ship has wood spars and ribs. Forward, the fuselage is steel-tube truss, aft metal monocoque. Engine cowl is hand hammered from aluminum. The landing gear is Cessna, including the wheel pants.

Wings are spruce with 1/8 plywood ribs, with 1/2 x 3/16 cap strips and fabric covering. There are four flying (lift) wires, and two landing wires. You can't dispute the fact that modelers know a lot about stability. Little Toot required only a slight bending of a rudder trim tab during its test flights, which it passed with flying colors. It trims for level flight with elevator trim in neutral.

Meyer has made plans available ($50) to other builders, featuring steel tube stabilizer, rather than sheet metal, and steel tube aft fuselage—to make things easier.

For these plans only address: George W. Meyer, 1846 Hawthorne, Corpus Christi, Tex.

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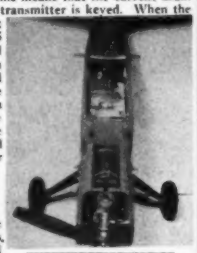
FOR REAL CONTEST PERFORMANCE.....

NORTH PACIFIC PRODUCTS CO. BEND, OREGON

John Maloney's M.A.N. memo No. 6

The nose shot in the first picture is a Guillow Explorer fitted with a Supertigre 19 BB $13.95. The model uses two Bennett Servos $13.95 for rudder and elevator and an OS Multi Servo $11.95 for motor control. The receiver will be a Controlaire 8, operating on 4½ volts. This will be available after we get out from under our SM-2 $14.95 backlog. The SM-2 is a small dual stage Carrier Wave (not tone) receiver with a 1AG4 in the first or the detector stage. The second stage or relay stage is fitted with a transistor. This means that the current drain is very low except when the transmitter is keyed. When the signal is on the current change at the relay is about 5 ma which is considered a real whallop. Because you get an expensive tube-transistor and a relay plus assembly for the very low price of $14.95. You can understand why we have such a backlog. We recommend our assembled HH 3A4 $19.95 transmitter with this receiver.



SUPERTIGRE 19 $13.95

One of the reasons for the Max 35 $12.95 is the by-pass porting in the piston and sleeve. The second picture shows this extra porting usually found only in $50.00 racing 60's. The OS Max 35 is also available in an R/C version $16.95. Also shown with the sleeve and piston is the OS Max 35 crankshaft which is the largest in diameter of any 35 to the writer's knowledge. This permits a large port in the shaft. The Max 35 runs very well on pressure and we recommend it on R/C.

MAX 35 CYL.-SHAFT

Some time ago we boasted quite strongly in this column about the virtues of WORLD ENGINES SILK. per yd. 89c white, colors $1.00 per yd. It handles easy when wet, does not pull apart, tightens up well on the model. Also and most important it takes only a minimum of dope to fill it. Red, light blue, dark blue, green, orange, yellow and white. We must have been right as we get consistant repeat orders. One of the best selling engines we handle is the OS Max 15 R/C $13.95. This engine developes real power. Was the World Power champion in FF in 1956. It starts easy and it throttles down to a smooth purr. The R/C Max 15 is $13.95 the std. model is $9.95.

World Engines is the exclusive representative for OS. Supertigre, Oliver, David-Anderson. Frog engines, Controlaire, Bennett We will accept full price orders for any of the above.

We take no trade ins out of consideration of the dealers we are doing business with.

We mentioned that our Canadian counterpart is Academy last month. We named principals Germain and Grunsten but forgot to mention Laurie Ellis who contributes much to the flying knowhow as well as the merchandising mechanics.

Pictured in No. 3 spot is an OS 4000 ohm relay $3.95 we placed a book of paper matches along side to show the small size. At the same price 50 ohm and 100 ohm relays are available. On my postage scale these weigh .4 oz. each and are extremely small. These relays and also reed banks are shown in our catalog 15c. The SM-2 is in the background of the relay picture.

OS RELAY $3.95 & SM-2

We now have a tuning fork vibration type tack calibrated up to about 17000 rpm $1.50.

BENNETT M/SERVO $13.95

The last picture this time is the Bennett Multi Servo for $13.95. The characteristics of this servo make for quick response to signal, very low current drain, very light in weight. Also and this is important it is easy to figure out how to adjust them to get your neutral in the right spot. They can be mounted in a variety of positions $13.95 and this is assembled and tested. This is not a kit price. Had a letter from R. C. (pylon race) Allen recently giving us his vote for this type of advertisement. (He has good eyes).

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IN THE U.S.A.:
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Phone: TW 1-7936

Gramps and I

(*Continued from page 26*)

tions that came up were very carefully answered by Paul Runge of Ace. At this time I also purchased a Field Strength Meter kit (low priced with a transistor) to be used in tuning the transmitter. After the units were completed I was dismayed when on the first tests nothing seemed to work right. Luckily, I had met one of the RC boys in my neighborhood and he set my mind at ease by locating the problem only as a tuning one. We first tuned the transmitter by using his FSM (field strength meter) and then used my transmitter to tune my FSM.

The money I saved in constructing the transmitter was used to buy some preliminary test instrument, quite necessary if you are to know what you are doing: a cheap 0-50ma iron vane meter for checking transmitter, a 0-5ma moving coil D'Arsonval type meter for testing receiver (low resistance). I also acquired a Polk's Multi-Tester. Such an instrument is indispensable if you are assembling your receiver or transmitter from kits.

By this time the plans had arrived and the plane was under construction. I made every effort to double cement all important junctions and to keep all parts warp free and to plan. No changes were made at all; something frequently encountered when a modeler surveys his plane scattered over the ground and sheepishly admits that he made some minor changes "to improve" the plane. By the time the fuselage was ready I had decided to try the Lafayette's Hard Tuber that comes ready to go at a very low price.

The receiver would not pick up properly when installed in the plane. However, I had remembered reading that when metal torque rods are used, they act as extensions for the aerial and it may be necessary to place a capacitor between the aerial and receiver to cut down this effect. While browsing through a radio parts store, I had purchased a surplus radio part having a number of various valued resistors and capacitors on a panel for about 50 cents. I took a 20mmf valued one to check what effect it would have. It worked perfectly. The relay gave me some trouble, but by setting up a relay tester as illustrated, the proper pull in and drop out settings were made. I decided on using metal battery holders in the plan to facilitate changing. Since Gramps was a sort of primary trainer which could carry quite a load I used the larger batteries. The receiver drain was 100ma. so a "D" sized cell was used for A. Two "D" size batteries were used for the Babcock Compound Escapement. Rubber bands were used on the battery holders to insure a constant tension. The wings were now completed, covered with silk. The tail units had been finished and covered also. A final check was now made in the cellar and in the back yard. Test glides indicated that the model was trimmed well.

The next Saturday afternoon I packed my audience, wife and two little girls, in the car and with the trunk full of plane and radio gear, we drove some 20 miles to the closest large field suited for radio control flying. The transmitter was set up and the plane parts assembled after a nervous and hurried check. Prior to the launch, I asked my wife to key the transmitter to check the receiver while the motor was running. Nothing happened. I finally stopped the motor and located the trouble by readjusting the relay again. We were now as ready as we would ever be. I revved up the .19 higher than I should have, waved to the family, and then raced madly across the field to get my 4 lb. missile airborne. Gramps roared away. However, by the time I sprinted back to the transmitter, the left wing had dropped and Gramps had soloed into the ground via a tight left spiral dive. The first portion of this article could be called "How To Do It", but this final portion should be entitled "How Not To Do It".

The engine had been revved too high, the offset had not been sufficient (the plans were correct but I had made an error) and also no one was at the transmitter to correct any bad flight tendencies. I gathered the pieces of wing, piled everything and everyone in the car and started for home. The cellar light burned quite late that night, and the next day, Sunday, we were all set to go again.

I made a thorough field check, assembled the wing to the body, put a very small amount of gas in the tank, and launched Gramps. My wife was again at the transmitter keyer with enough instructions, I hoped, to correct any turning tendencies. However, Gramps was in a good mood and properly trimmed, for he roared away straight as an arrow gaining moderately in altitude. I beeped once and Gramps immediately banked to the right. The turn was getting tighter, so I let the button up and Gramps leveled out passing over our heads. If someone had given me a million dollars I don't think I could have been happier. The gas supply was exhausted now, the keyer was beeped again and Gramps was put into a turn to bring him back to our area. The glide was very flat and smooth and he landed about 60 feet away. A chronicle of my first 10 flights would be of interest, since I certainly learned from experience.

1st. Short but good.

2nd. Fortunately the motor stalled. I had neglected to turn on the receiver switch.

3rd. Flight resulted in a half mile dash after a rapidly disappearing plane. I lost control when the motor stopped while the plane was far down wind of me on a breezy day. Damage—gladly absorbed.

4th & 5th. Two broken props. I had not noticed that a shim block over the leading edge of the stabilizer had dropped out. Just couldn't pick up any altitude on launching.

6th. Perfect flight on both right and left turns. Several spiral dives were necessary to lose altitude.

7th. Trying to take off, I beeped too soon, causing the plane wing to brush the ground turning the plane 180 degrees. Before I knew it, Gramps had flown into the side of my car. Wing and motor mount broke.

8th. Good flight.

9th. Lost control. However, motor stopped before plane got too far away. Trouble? The aerial clips into the receiver via a tiny pin and plug that never did hold very tight, must have snapped out on the launch. Problem solved by soldering connection securely.

10th. Good flight. I was able to bring the plane back to a landing within 50 feet of the transmitter.

Gramps has now passed his 38th flight. He has been patched up a considerable number of times, but a new coat of dope makes him look as good as new. A deBolt servo has been added with a Bramco throttle for motor control. We have had many pleasurable hours together, Gramps and I, both of us learning more with each flight!

* 1. Radio Control for Model Aircraft & Boats—Edited by Bill Winter ($1.00)
2. Radio Control Handbook by Howard G. McEntee ($2.25)
3. Basics of Radio Control ($.35)
4. Application of Radio Control ($.35)
5. Commercial Radio Control ($.35)

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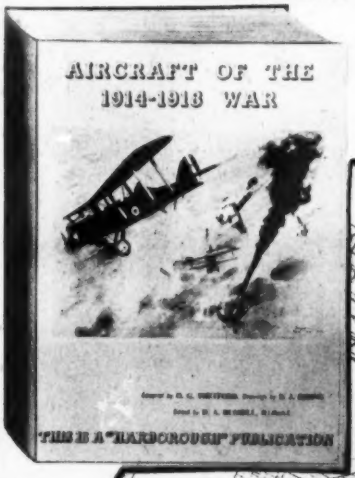

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Radio Control News

(*Continued from page* 19)

pulse, escapement or what-have-you. Plans available from Dr. Reg. Mitchell, 11100 Ralston Road, Rockville, Md. for $1.00.

• • •

From Watts New, club paper of the Fresno Modelers, comes Figure 2. This is a Quick Blip circuit, most useful for those with slow fingers. The circuit layout is not critical and the unit may be mounted inside your transmitter box. It will, by pressing SW_1, give a short impulse to the relay which in turn keys the transmitter. No timing of the switch is needed since the relay is blipped by the discharging of the capacitor. Selection of the value of the capacitor depends upon the time you want the relay to be energized and the type of relay coil used. For a Sigma 4F the value is .5mfd and for the Gem relay it is .77mfd. Be sure to open SW_2 when the unit is not in operation since the battery will discharge through the capacitor and become exhausted.

• • •

The Kraft tone receiver in the March issue was described as the hottest receiver of its kind we had ever seen, that would do much to popularize tone, and was something anyone could build. Since then, letters from all sections of the country say these claims are true. A typical letter came from Harold Denny, W9CMP of 10 Potersville Road, Washington, Ind. states; "No trouble with construction, even with cutting out the copper circuit with a knife. Excellent operation at a distance of 3000 feet with less than 1-watt input to the transmitter and with the receiver setting on a box 8" "off the ground."

To give it a really tough test, Mr. Denny placed the receiver in a drainage catch basin, six feet deep, and got a 700 foot range. Reliable tuning may be done at 100 feet and there is a slight blocking action at about 50 feet. This column believes the Kraft receiver to be one of the most reliable and easy-to-build receivers of this type ever offered to the RC fan.

• • •

Much interest has been shown in the numerous nickle-cadmium cells, available in standard flashlight cell sizes. Current ratings have appeared equal to the popular VO cells. However, further checking with battery companies shows that there are two types of construction in these cells. The pressed-pocket type plates and the sintered plates. The pressed-pocket type has the active materials held within a wire mesh or perforated pockets of a plate. These units are designed for average discharge loads at a fairly long cycle life. The sintered plate type has the active materials held within the fine pores of sintered nickle sheet, having very high surface area. These units will handle high discharge loads and have extremely long cycle life. The VO series of cells and the Sonotone cells are the only sintered plate units we have checked so far and they will handle the high currents experienced with actuator use. Cells such as the Eveready N46, penlight cell size, are rated at 450 MAH, but are limited to a fairly lown drain, in the neighborhood of 45 to 80 ma. Some of the battery manufacturers of the new cells do not recommend their cells for RC use at high current drains. The Eveready N46, Burgess CD6 and Gould AA cells would be excellent for the new transistorized receivers which generally have a maximum drain (on signal) of 40-50ma. Nickle-cadmium batteries and cells appear more suited for RC use over other quality type units due to their low cost and high cycle life. They are not capable of supplying high currents for as long a time as the silver-zinc type but, as stated,

their other features make them well suited for our use. The temperature range for nickle-cadmium cells is 60 below zero to 160 degrees, or more, above. No guessing during charging or discharging and virtually an unlimited cycle life (recharges) are other features.

CLUB NEWS

BIRDS stands for Beginners In Radio Drones, with the nesting spot being Cisco's Hobbies, 4127 Norse Way, Long Beach 8, Calif. Mr. Dallas Moran, of the club has a 9' 10" Super Taylorcraft, powered with a Forester 99, using an Orbit 8. Actuators are two Bonner and two Slimline servos, giving flight control plus steerable tail wheel and brakes.

• • •

From the EBRC Carrier learn that Larry Murphy has a Waco biplane with Mickey Mouse control. Darryl Usher will try his Ascender with Simpl/Simul, Dean Montague has a .19 powered Cub which weighs but three pounds and flies like a dream and Grover Greimes has a 64" Stearman biplane with an Orbit 8 and full house on controls. Not to be outdone, Mrs. Greimes is flying a Cessna 180 and has finished an .020 job. It is said that Larry Murphy's Waco has enough down elevator to "do outside knot holes." During a February Precision Contest, over 15 planes were on the field and awards were made down to 8th place. All winners used Orbit 8 or single-channel equipment except one CG single-channel and a homebuilt 5-channel. Those wanting to know what kind of ships the west coasters build will find, in order of winning, Bill Gates—Schneider Cub, Torp 45; Dale Root—Ascender MK-3, Torp 45; Alex Schneider—Schneider Cub, Spit 60; Adelung—Missile, Spit 60; Carter—Low Ender, Torp 45; Biscay—Smog Chaser, Fox 25; Brock—Tri-Pacer, Torp 19; Jacobson—PT19, Torp 35; Heise—Glider, Atwood .049; and Schulze—Rudderbug, Torp 19.

From reading The Transmitter (Aerial Robots) one becomes "Hog" conscious. In addition to the Smog Hog and Astro Hog there is the Farmer's Hog, a cabinless Smog Hog, and a Cub Hog. The Farmer's Hog uses a Torp 45, weighs 6 pounds 13 ounces, and has the trailing edge of the elevators left square, ala Walt Good. This is said to give the Hog more sensitivity in landing approaches and better and faster control in maneuvers.

• • •

Kelly Day of the IBM RC club in Poughkeepsie, N.Y. was the first hardy soul to make an RC flight in the 1959 season, same occurring on Easter Sunday. Too cold and damp for the rest of us. Kelly flew a new LW Trainer with Simpl/Simul and the Kraft tone receiver. Everything worked perfectly and the Kraft receiver has another booster in the country who claims it to be the hottest job he has seen. Looks like this area will swing to pulse this year with S/S and the WAG system the mainstays.

• • •

Meet for rudder only, intermediate and multi, put on by the DC/RC club at Frederick, Md., on July 4th and 5th. Prizes for highest scoring junior and highest speed in pylon. Must have your AMA and FCC license. Contact Bill Grogan, 105 Hilltop Road, Odenton, Md. for further details.

• • •

The Aerial Robots of Modesto, Calif. have scheduled an Open Speed Weekend for June 20 and 21 at Turlock. Any and all kinds of speed events for RC jobs will be featured and planes will be timed by the EBRC's Electronic Timer. Pylon events for rudder only, intermediate and multi.

• • •

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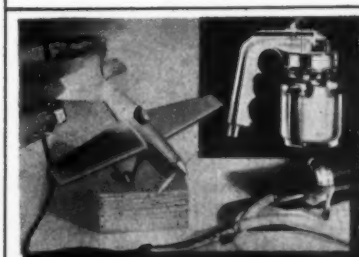

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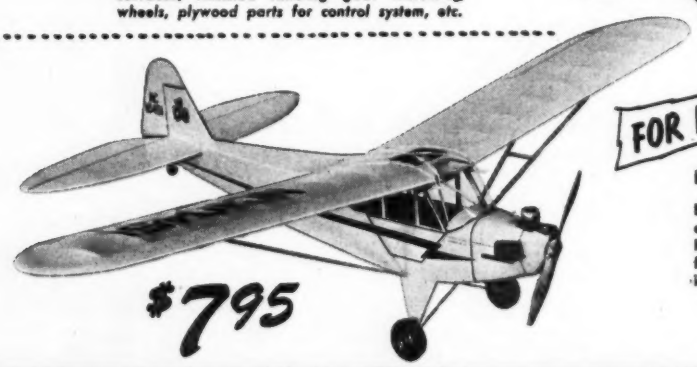

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The Olean Model Airplane Club, 209 N. 15th St., Olean, N. Y. will hold its 2nd Annual RC Air Show on July 12th, more of a get-together than a contest. However, cash awards to the first 35 entrants signed up who make at least one five-minute flight. Cash awards also for the most spectacular flight, smoothest flier, worst crack-up, etc. Dollar bills will be attached to spot landing sticks throughout the day. No entry feel James H. Messer for additional information.

• • •

The Central Connecticut RC Club will hold a Class AA meet at Farmington, Conn. on June 21st. This is the 2nd Annual Southern New England RC meet and for further details contact Mr. Michael Adajian, 66 Gladding Place, Kensington, Conn.

• • •

Bobby Byrd of the Jacksonville Radio Control Club, Fla. has his Sea Cat fitted out with an Aerobee-Hi rocket under the port wing. A K & B 35 provides plenty of power and a Lorenz 2-tuber and Babcock Mark 2 escapement take care of the control and rocket firing system. Interested in an inexpensive missile launching platform?

• • •

Last minute contest notices include the Sixth Annual New England RC Championships being held at the Orange Airport, Orange, Mass., August 30th, dawn to dusk. This has usually been an excellent contest with the AMA precision and stunt pattern being flown in rudder, intermediate and multi. Also, the AMA pylon and RC scale events plus a craftsmanship event on all entries. Contact Richard M. Jansson, 39 Sterling Drive, Dover, Mass.

• • •

The Meadville Are RC Society is holding their 2nd Annual RC contest on June 14th at the MARCS airport, seven miles north east of Meadville, Pa. There will be a Jr. and Sr. event in rudder only, and open in rudder only and multi. All first prizes are $25.00 cash, with cash and merchandise for all other places. Contact E. J. Daum, R.D. #3, Meadville, Pa.

• • •

NEW ITEMS

Babcock's new all plastic Aeronca in yellow and red, is similar to their Tri-Pacer, with a few improvements in construction. Based on the performance of the Tri-Pacer, this should be an excellent model for the novice on advanced RC fan. Uses an .049 to .065 engine. Be sure to follow instructions for assembly, especially the use of the proper cement. Do not slap it together and you'll have a fine flying model. Our Tri-Pacer performed well on the first flight.

• • •

Xact-O has a new Lock-GriPlier. This $4.50 item will serve as a plier, vise, wire cutter, stripper, crimper, tweezer, wrench and a heat sink. For handling small parts for soldering or assembly work, this 'third hand' will prove invaluable for intricate jobs. At your electronic parts jobber.

• • •

Altimeter marketed by Gull Model Airplane Company, 10 E. Overlea Avenue, Baltimore 6, Md. is 1¾" square x ¾", weighs ⅛ ounce. Well built. Each unit is individually calibrated and so far we have found ours to be accurate within about 12 feet, although 10 foot accuracy has been obtained in England. For altitude work, the unit is adjusted prior to launching and the reading is taken when the model returns to earth. Nothing need be carried but the altimeter. Checking is done with

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a small light bulb and battery. Engine cut-off, bomb dropping, etc. can be achieved at a predetermined altitude by carrying two pencells, or whatever supply is necessary for operating your device. The altitude can be set to anything from about 30 feet up to 4000 feet. Haven't had a chance to flight check our unit yet but all tests were performed in a precision vacuum chamber.

• • •

Polk's Modelcraft Hobbies, 314 Fifth Avenue, NYC, Spacemaster receiver weighs 1¾ ounces, operates from a single pencell and a single miniature or sub-miniature 22½ volt hearing aid battery. Field reports to date have been favorable. Polk's also have the new VT-25 diesel, about an .014 cu. inch size. Bore is 7mm, stroke 9mm, RPM 10,000, power .025 HP. With a weight of but 17 grams this might be a good contender for an indoor RC job.

• • •

The Cobb Hobby Electro Compound, pictured in the May issue of MAN has been tested and here are our results. Operation was perfect on VO-500 cells, meaning but 1.3 volts applied to the motor. The "electronic brake" which is used to prevent overrun and movement when in a control position or in neutral, is equal to any mechanical device we have seen, and there are no parts to wear out. With an applied voltage of 1.3 volts, we observed a current of 550ma when moving from position to position, no current being drawn when in any given position. Power to the pushrod is more than enough for most any large model. Cobb advises nylon gear trouble has led to replacement by metal gears. So far Norm Rosenstock has checked a unit out to 63,000 operations.

• • •

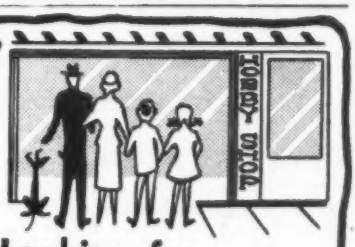
New Trabant RC Slope Soaring Glider marketed by Wilshire Model Center, 1326 Wilshire Blvd., Santa Monica, Calif. This 86" beauty was designed by F. Militky of Germany and the kit is unique in that it contains everything including dope and cement. Plans are in German and English. Wilshire also markets a 48" low winger for .074 to .09 engines, suitable for RC or FF; and a 44" biplane. Both kits contain dope, cement, and rubber wheels.

• • •

The 1959 National IRE Convention and Exhibit in NYC in March did not turn up anything radically new for the RC line. The majority of subminiature or miniature parts were designed for military or industrial use and the price was high for our use. Of top interest to us was the new RCA Nuvistor tube. Yes we said tube, transistors are fine but there still is a place for tubes. This new tube is about ¾" in diameter by ½" high, excluding leads. The Nuvistor is scheduled to reach the market about the end of this year and is said to be competitive in price with standard radio tubes. High frequency response is excellent (465mc and up) and the triode and tetrode types presently announced, operate on very low plate voltage. In some cases they will oscillate down to a few volts.

• • •

With pulse work making rapid gains, Charles Kenny of the North Jersey RC Club has developed a variable pulse-type actuator which measures 1⅝ x 2 x 3" and weighs 2¾ ounces. Suitable for proportional control systems it does not waggle the control surfaces because of 108:1 reduction. One half inch each side of neutral is obtainable and the throw bar provides rectilinear motion. Use with three volts. C. Ken-



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• • •

CG Electronics Corp., 15000 Central, East, Albuquerque, N.M. is discontinuing their entire line of 30-volt multi-channel receivers and transmitters. However, many new items are in the offing from CG, including the following: The Pioneer, a low cost version of their famous RX-1 receiver, weighing but one ounce. This 3v unit is a superregen set having no relay and if this doesn't popularize the indoor RC job nothing will. They also have a single-channel superhet, operating from three volts and measuring about 1 x 1¾ x 2¾." Sensitivity is equal to or better than standard superregens and selectivity will simultaneous operation on all the new frequencies. Also, CG will market a converter that will convert all of their receivers to superhet. (This is the type of item that even we said would be a near impossibility.) The unit is tailored to their receivers although there is a possibility it will work on other units.

Their T-8 and T-12 transmitters are being re-designed under new names of Venus, Hercules, etc.

The CG transmitters are of the MOPA type, using .005% fundamental crystals. Antenna loading has virtually no effect on the oscillator frequency. If you want your CG transmitter brought up to date and put on frequency, you can do so by shipping it to CG for circuit and crystal change. These particular crystals list for $4.95. In reviewing other items from CG, not yet released, we believe they will be very instrumental in popularizing superhets in much the same way they popularized transistorized multi-channel equipment. A brochure giving all schematics of all their equipment, including the new superhets, available about July 1st, for 50 cents.

• • •

The C. A. Zaic Co., Inc., 883 Lexington Ave., Brooklyn, N.Y. has a new Jetco R/C Piper Super Cruiser suitable for .020 to .049 engines. The 40" model features the CG RX-1 receiver (as does their previous kit) in detailed installation plans, a plastic cowl, hidden rubber bands for wing and tab and a complete set of decals. Soon available will be a 36" Cessna 170 and a 40" Luscombe Silvaire.

• • •

New reed banks from the makers of the MIN-X equipment. Contacts are adjustable and the units are said to be the smallest available. Prices are: 6-reed, $14.50; 8-reed, $19.50; 10-reed, $25.50 and 12-reed, $30.50. Available from Min-X Radio, 6555 Oakland, Dept. M, Detroit 2, Mich.

I Collect Old Engines

(*Continued from page* 21)

Brass parts (needle valves, etc.) should be polished with steel wool or rubbing compound. Cracks (or even broken lugs) can be repaired with Plastic Aluminum, a product available in most hardware stores. When dry, Plastic Aluminum can be filed, drilled or sanded and, in most cases, is indistinguishable from the original metal.

Many old motors are plagued with bent cylinder fins. To straighten them, use a thin bladed screwdriver and gently pry them into position. This may take a little time, but it's well worth the effort. One word of caution: some old motors, particularly those with magnesium castings, tend to become extremely brittle with age. Machined aluminum, however, is inclined to remain fairly ductile. Your best bet is to play safe and treat all elderly parts with due respect.

If the motor has timer points which are

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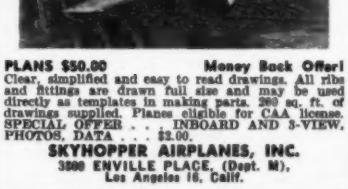

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badly pitted, file them lightly or draw pieces of #400 sandpaper through them in the closed position. Dress the faces so that they are parallel and adjust the gap to postcard thickness.

Gasket material can usually be obtained from your local hobby shop. If not, auto parts stores carry thin automotive gasket paper which is fairly inexpensive. In a pinch, use ordinary typing paper. The required thickness can be gauged from the discarded or broken gasket. To make a new one, simply coat the part in question lightly with oil, press it *hard* against the gasket material, and then cut around the imprint with a new single edge razor blade. This may require a little practice, at first.

Well, by this time you should have a nice looking bunch of parts. Reassemble them with the same loving care and please remember that oil is mighty cheap—use it unsparingly! Place one or two drops of "3 in 1" on every moving part. Since this particular brand of oil also has excellent rust prohibitive characteristics, it's a good idea to lightly coat the crankshaft threads as well as all other external steel parts. Spark plugs are not easy to come by any more. so extend your gusher to this item. When the motor is back together again and there are no extra parts sitting around, congratulate yourself and then wipe off the excess oil before you splatter up the house.

Now what about the motor that has a missing timer or needle valve? As we mentioned before, these parts are difficult to obtain, depending upon the age and type of motor being reconditioned. In the past year, however, we have visited hobby shops that, believe it or not, still carry a few assorted parts for Arden, Bullet, Atwoods, Delong, Madewell, Super Cyke, Thunderbird and several others of the 1946-1948 era. Occasionally, we'll spot a part for some pre-war motor and it will be purchased without actually needing it—just to give to some friend with a timer-less Brown. (It just happens that I have a Morton M-5 prop nut and would be glad to receive a motor from some kind reader to put it on.)

For the less fastidious collector or one who has encountered extreme difficulty in finding some original replacement part, there is a certain amount of interchangeability possible among older motors. If you can replace a part with one that fulfills the same function, this may be all that is necessary. The Synchro PC-2 and Pioneer Brown have several interchangeable parts with the Rogers and KD-29. Rogers motors have a brush type timer which can be used with several other motors of a similar design. Bond .57 and GHQ parts can also be interchanged. Some present day .35s have quarter inch prop nuts which fit Browns and Baby Cyclones. The front prop washers can be used, as well. Needle valves of the universal type come in mighty handy, too.

Engine collectors seem to be continually harassed by mothers and wives because the "darned things" have a way of cluttering up Ye Olde Living Roome. There are many ways of displaying motors and one of the best is a glass door cabinet with several shelves. This will keep them off the TV set and has the added advantage of being a visible, dust-proof display. The mounting block shown in the sketch can be made of wood or plexiglass and is a very simple, but neat way of showing off your engines. If you're going to the trouble of displaying your motors in the first place, it's well worth while to spend a little extra time on the method of mounting. Radial mount engines can be accommodated by simply attaching a vertical piece to the rear of the mount, instead of utilizing the dowel uprights.

Of course, some collectors don't display their engines at all. They are mainly interested in collecting them and don't give a hoot or a holler who sees the results of their efforts. In this case, the best way to store engines is in their original boxes. Most motors have an array of extra parts such as instruction sheets, coils and condensers, prop wrenches, etc., and the original box makes the most logical place to keep everything intact. Other small, stiff boxes can substitute. Actually, there are several advantages in keeping engines individually in boxes. For one thing, they won't jostle around and bang up what you've already taken pains to recondition; also, they remain free from dust and humidity. An alternate method of storing that we've found very successful is to wrap the engines in plastic refrigerator bags. Before putting any engine away, however, place a drop or two of oil in the exhaust port and venturi. Clean white gauze in all orifices also helps to keep out the dust.

Whether your motors are displayed or stored, periodically inject a few drops of oil in the openings and turn the crankshaft over a couple of times.

Finally, we would like to offer a suggestion for putting your old engines to a very good use. Arrange to show them at a local club meeting. The curiosity and interest that is usually shown will really amaze you. And who knows? It might get some other modeler started on a very fascinating way to sit out the poor flying weather. Engine collecting (I might have said this before) is a lot of fun.

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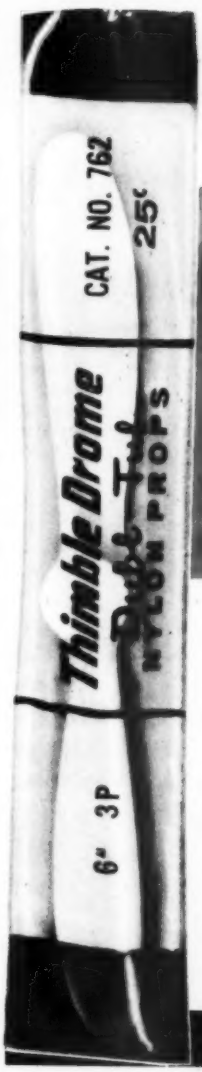

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4	2½	2	20c
4½	2½	2	20c
4½	4	2	20c
5	3	2	25c
5	4	2	25c
5	3	3	25c
6	3	2	25c
6	4	2	25c
8	4	2	60c
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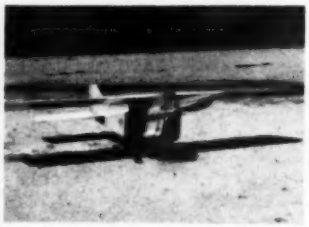

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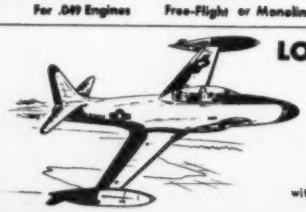

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LOCKHEED "T-33A"
29¼" Wingspan ¾" = 1' Scale

BERKELEY MODELS INC.

with Impeller Fan

Half Alpha

(*Continued from page 17*)

whereby the performance of various free-flight planes may be evaluated and compared. Some modelers prefer to check a model's performance during contest competition. Others would rather fly their planes early in the morning or even at night to judge duration under so-called "dead" air conditions. Both systems are not without the "luck" and "human" factors.

Half Alpha received its "duration ability" tests in the "dead air" manner, since no contests are held in the southern Ohio area, during the first few months of each year. Test flights were made between the hours of 7:15 and 9:00 on two different mornings.

First day's weather conditions were: temperature—29 to 33 degrees F., clear sky, five mph. wind, 40% humidity with frost on the ground. A 15-second engine run was used with a ROG off the ATO peg. Five flights produced an average of three minutes and 11 seconds. Second morning's conditions were: temperature-44 to 47 degrees F., overcast sky, three mph. wind, 86% humidity and wet ground. With same engine run and ROG setup, five flights averaged out to three minutes and 28 seconds.

A slight change in the fin's trim tab offset before the second flying session improved the power-glide transition. The ATO take-off is not the least bit sluggish and Half Alpha climbs without hesitation.

No trouble at all was encountered in building Half Alpha to the minimum weight. Important factor here is the familiar Warren Truss construction. It permits the use of soft, light wood without any loss in strength. The truss arrangement with top spars in the wing and stabilizer practically eliminates any tendency to warp. Used in the fuselage, this type of construction will also get rid of the sway-backed and sway-sided appearance caused by the use of a few, sparsely located formers. The end result is a plane able to withstand accidents, pilot's errors and arguments with trees.

Add up the advantages—long lasting structure, high performance capability and ease of power and glide trim. What other incentive is needed to start you building Half Alpha?

CONSTRUCTION

Wing: Using an aluminum or plywood template, cut out 28 diagonal and five straight wing ribs. Notch them for the center spar only at this time. Waxed paper is placed over the plans. Notice that it will be necessary to make a tracing for the left wing tip panel in order to construct the entire wing at the same time. Pin down the center spar and the leading and trailing edges. All are standard, readily available sizes.

Half Alpha flew best with the right wing half slightly washed-in, so build the warp into the wing now. Slip a 1/16" thick, balsa sliver under the right end of the center panel's leading edge. Keep the tip panels flat and this center section's twist will do the trick.

Cement three of the straight ribs in position; save the other two for use at the dihedral breaks. Sand or otherwise bevel the ends and center spar slots of the diagonal ribs. One of the small emery boards, the type used in manicuring finger nails, is handy for this purpose. Cement these ribs in place too. At each tip, trim the center spar, leading and trailing edges to a 30-degree angle, and then cement on the sheet tips. After an hour or so install the

(*Continued on page 42*)

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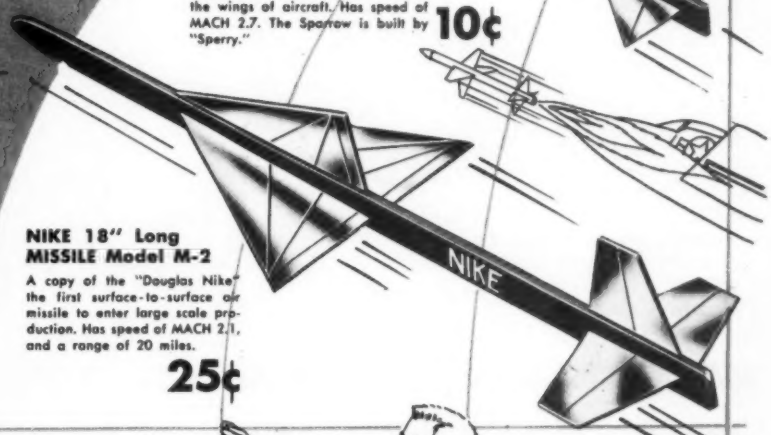

NIKE 18" Long MISSILE Model M-2

A copy of the "Douglas Nike" the first surface-to-surface air missile to enter large scale production. Has speed of MACH 2.1, and a range of 20 miles.

25¢

BOMARC 18" Long MISSILE Model M-3

This is a surface-to-air interceptor guided missile with a range of 200 to 300 miles. Its speed is between MACH 2.5 and MACH 3. The Bomarc missile is built by "Boeing."

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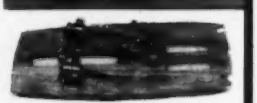

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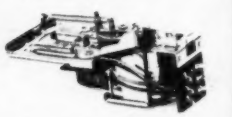

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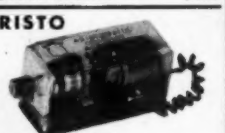

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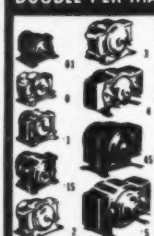

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Small enough to build into your Model. Specify range desired when ordering. Wgt. approx. 3 /4 oz. 0 to 1, 0 to 5, 0 to 50 $4.95

two top spars. Lay these across the ribs and cut their notches. That way you'll have straight spars with a minimum of fuss. Again allow the cement to dry. Remove the wing panels from the work surface, carve the sheet tips and leading edges to match the airfoil and sand each panel. Remember that a smooth covering is a direct result of thorough sanding and elimination of all excess bits of dried cement, etc.

The ends of the wing panels are beveled to form tight dihedral joints. Weight the center panel down, notch the dihedral break ribs, cement them in place and add the tip panels. Block the latter up until you have five inches of dihedral at each tip. Gauze patches will strengthen the trailing edges. Later, after this assembly's cement is hard, the four dihedral braces are inserted and all of the joints given an extra coat of cement.

Stabilizer: Construction follows that of the wing with a few minor differences. First, use the lightest wood possible while still retaining the warp resistance. This applies to the entire tail assembly; keep it light. Fourteen diagonal and four straight ribs are needed. Two of the straight ribs form a slot for the fin. There is only one top spar. Two stiffeners are located behind the leading edge at the center. They furnish a broad, firm base for the dowel "keys" used to keep the stab centered on its platform.

Two or more sheets are butt cemented together to form the fin. Align their grain with the fin's leading edge, trace its outline and cut out. The leading edge is rounded. Sand the others to a taper. The adjustable trim tab is now cut out. Soft aluminum or wire hinges are pressed into position and the tab replaced. Dabs of cement will secure the hinges. Drill a 3/16" diameter hole for the stabilizer mounting rubber bands. Cement a gauze patch on both sides of the fin at this point for reinforcement. Recoat with cement and the fin is completed.

Fuselage: Construction will proceed at a smoother, faster pace if you alternate each step, allowing cement to dry on one assembly while work continues on another.

Make up wide sheet stock for the pylon core and the wing and stab platforms by butt cementing narrower sheets together. Then cut out all fuselage formers and the two fuselage sides. Place one side flat on the workbench and glue the formers in place.

Former number one has the fuel tank cemented to it. A short, wedge tank, the Perfect Number One, is large enough with its quarter ounce capacity. The timer mount hole in the left fuselage side is dimensioned for the Tatone Tickoff timer. Small bits of plywood cemented around the opening will give the timer's three mounting screws something to bite into. Add a built-up box to house the timer's works and prevent oil seepage into the fuselage if you want.

Cut the pylon core and platforms out of the wide sheet. Do not cut the slots for the two wing hold-down dowels yet. Cement the six pylon ribs to the core, checking to see that they are perpendicular. A 6½" length of 1/16" diameter music wire makes up the landing gear. Form one end of this into a zigzag shape. Sandwich this end, along with a liberal amount of fuel proof cement and the 1/16" thick section of firewall between the two pieces of ⅛" thick plywood. It will be necessary to cut a slot in the thin ply to accept the music wire. A small, flat head, wood screw will hold everything together, or if you prefer, a C-clamp will serve the same purpose until

(*Continued on page 44*)

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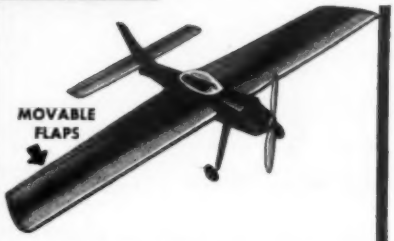

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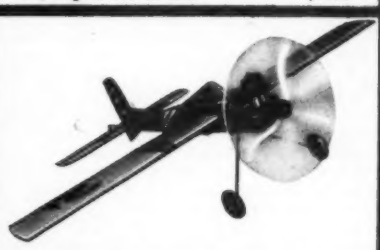

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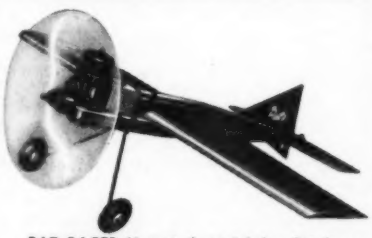

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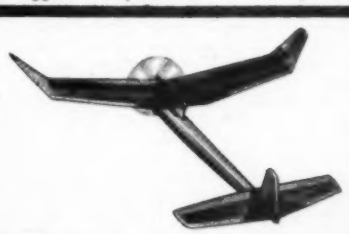

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the cement dries. Later drill holes for the Thermal Hopper Mounting Cage, and cement 3-48 nuts on the rear of this firewall. Better yet, solder these nuts to a piece of brass shim stock and cement this to the firewall.

Certainly by this time the fuselage formers are firmly cemented to the fuselage side. Stand the side on its edge, align it over the fuselage's top plan view and pin down. The nose of the fuselage should extend over the edge of your workbench approximately one inch. This will give clearance to the landing gear when the firewall is installed. Apply a ribbon of cement to the edge of each former and lay up the remaining fuselage side. Quickly now, add the small tail block and pin the side in place. Check and square the assembly before the cement sets up. It'll be necessary to drill a hole in the left fuselage side and insert through it an extension to the tank's overflow vent. Now cement the firewall in the fuselage nose. For the time being, only plank the fuselage top as far back as the rear of the pylon.

Meanwhile, back at the pylon—plane and sand its leading and trailing edges to conform to the symmetrical airfoil of its ribs. Open the slots and cement in the hold-down dowels. Cement pylon to the fuselage. Apply planking next. Use a pair of dividers to transfer the fuselage's top curve to the planking material. Also notch the front and rear edges of this planking to clear the dowels. A little sandpaper and more elbow grease will soon have these edges tapered and looking like "Cross-section A" as illustrated in the drawing. Top pylon off with the wing platform.

Groove the tail block so a short length of 3/16" O.D. aluminum tubing will fit under the stab platform. Flare one end of this snuffer tube so fuses may be easily inserted. Cement tube and platform in position; don't forget the stab mounting dowel. The rest of the top planking, from the pylon to the stab platform, is added next. Grain of top and bottom planking should run the length of the fuselage. Any tendency for the fuselage to acquire an upswept warp or a change in decalage is eliminated if the entire fuselage remains pinned to the workbench until all cement is dry. After removal, install a 1/16" O.D. (outside diameter) aluminum tube for the ATO (angular take-off) peg's pivot and the bottom planking. Don't, however, cover the nose's bottom until you've taken care of the following.

A length of fuel line through a hole in the bottom planking is the simplest way to provide the engine with fuel. There is one drawback to this method, since the plastic line can't be glued down; oil will gradually seep into the fuselage to soften the balsa and hasten its deterioration. Bend a tiny elbow out of a ¾" length of 3/32" O.D. brass tubing. Connect the elbow and fuel tank with a short piece of fuel line. Cement the elbow in the hole, forming fillets on both sides of the planking. The fuselage will stay dry and free of oil. You'll be able to slip a piece of surgical tubing over the elbow's exposed end and pass the tubing through the timer and to the needle valve.

Only a few finishing touches remain. Round and smooth the corners and rough edges of the fuselage. Cement gauze strips across the firewall, lapping the ends onto the fuselage sides about a half inch. A wire dethermalizer hook goes under the tail, and cement fillets should be formed at the stab and wing platforms and around the pylon's base.

Taper the ATO peg and round its corners too. Bind and cement an L-shaped

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We're shipping this new product as fast as we can pour it into the tubes, so please be patient if your local dealer is still waiting for supplies. It dries FAST, gives 'Ambroid-tough' permanent joints and is Crystal Clear. Better junk that old-style sticky stuff and pick up an extra-large 15¢ tube (28 cc) of Ambroid Plastic Cement today.

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piece of 1/32" music wire to the peg's large end. See that the wire pivots freely in the aluminum tube. A rubber band around the fuselage and peg will retract it after a take-off.

Covering: Half Alpha was covered with GM *Silkspan*. Trimming the model with different colors of covering material will aid in identification without too much of an increase in weight. That is why the fin and fuselage were covered. Prior to covering, all surfaces should be sealed with a coat or two of clear dope and the fuzz lightly sanded off.

After covering the fin and stabilizer, cement the former in the stab's center slot. Also add the top, wire dethermalizer hook where the fin meets the trailing edge. Center the tail assembly on the platform, invert the plane and cement four dowel "keys" to the bottom of the stab. Two take-off pegs may be added to the stab tips. They are two inch pieces of 1/16" dowel.

Give the plane four coats of a thin, clear dope mixture; one part dope to one part thinner is about right. Sand lightly after every other coat. Check the model's weight now, and if it's still a fraction under the minimum allowed, apply more dope to the wing *only*. Finally add two coats of Tuff fuel proofer. The motor is mounted with zero side thrust. Thin washers provide the slight amount of down thrust used. Bolt on your favorite 6-3 prop and stick with it through testing and competition.

Flying: Flight pattern is a right turn under power and a left in the glide. Test glide the model, trying to launch it from an elevated location so the glide circle will be nearly complete. A few launches in this manner will give you a good opportunity to adjust the glide in relation to flatness and circle size. A 3/32" thick shim on the left side of the stab platform will produce about the right amount of turn. Vary its thickness as desired. If anything, expect the glide to be a bit steep. A shim or two of postcard stock under the stab's trailing edge will remedy this. Start power tests when satisfied with the glide trim.

Simply stated, the power trimming procedure is this—as the motor's output is increased the fin's trim tab must be offset more to the left. The object—to obtain a right power turn against a left rudder.

Fix the tab in a neutral position with a pin or a dab of fast drying cement for the first test flight. An overly rich mixture will slow the engine enough. If the wing and tail assembly are correctly aligned on the fuselage, the plane will climb at a shallow angle, veering into a right turn. Use a short (four to five seconds) motor run at first to avoid a spiral nose dive. As the trim tab is shifted to the left the model's nose up movement increases, and the motor run may be gradually lengthened. The wing's wash-in will keep its right tip up, preventing a steep bank. Continue testing, remembering to always make the motor and tab adjustments together.

Soon the motor is at its peak rpm and runs have been stretched out to 15 or 20 seconds. Climb angle reaches nearly 60 degrees with the right turn not too tight or loose. The plane will swing smoothly from climb into glide when the power quits. Preserve the tab's final position with cement. From now on fly with the engine at its peak rpm.

Prevent pilot's error and "accidents;" give Half Alpha a chance to show what it can do in that fourth, fly-off flight.

(*Continued on page 46*)

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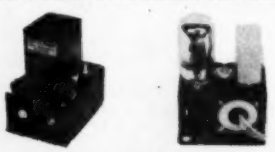

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Men and Ships

(*Continued from page 15*)

Son of a blacksmith and wheelwright, Harry George Hawker was born in the small village of South Brighton, Victoria, Australia, January 22, 1889. A reluctant scholar, he ran away from school for the last time when he was 12 to join an automobile firm, where he began the pursuit of his ambition to be an engineer. At 15 he was one of the best drivers in Victoria, and became an expert mechanic and engineer.

When Hawker's imagination was caught by the growth of the embryo science of aeronautics, he began to cast around for the means to learn to fly. Prospects in Australia were virtually nil, so with a companion of like interests he sank his savings into a one-way ticket to England and opportunity. For nearly a year he progressed from one ill-paid job to another, and at one time considered returning to his own country.

Prospects of learning to fly seemed to be as far away as ever when one day he received a wire from a friend who had joined the tiny Sopwith Aviation Company saying there might be a place for him. Fred Sigrist, works manager at the time, found Hawker an expert mechanic and a hard, enthusiastic worker.

His craving to fly soon reached the ears of T. O. M. Sopwith, and so Hawker got his first lessons at the Sopwith Flying School at Brooklands. Soon he was instructing, among his pupils being Captain John M. Salmond and Major H. M. Trenchard, both later-day famous service officers destined to reach highest rank in the Royal Air Force.

In charge of the Sopwith hangars at Brooklands, Hawker began his flying career in earnest. With only 20 hours flying time to his credit, he had several tries on the Sopwith/Burgess-Wright biplane for the

(*Continued on page 48*)

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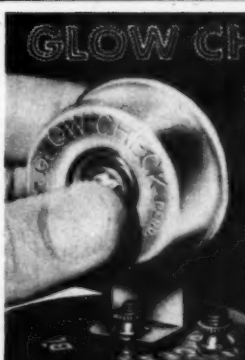

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British Empire Michelin Cup No. 1 duration record and £500 prize. A broken valve spring, high winds, and a rainsoaked magneto respectively brought the first and two subsequent attempts to premature conclusions, and on October 24th, 1912 seven days before the competition was to close, he again failed after an early morning 20-minute flight because of magneto trouble. A brand new Bosch magneto was hurriedly fitted, but meanwhile F. P. Raynham had taken off with some difficulty in the heavily loaded Avro cabin biplane for a rival attempt.

Over an hour and a half later, the Sopwith machine was ready, and Hawker took off with the A.B.C. motor hardly warm. Anxiously, and then with mounting excitement, the Sopwith supporters watched the two machines steadily circling the drome in a gentle 5-8 mph wind. To save fuel and engine wear, Raynham hung the Avro on the propeller in an alarming manner, turning the least possible revolutions on the Green engine. Hawker's machine kept to a safer 400-ft height, its geared down chain-driven twin propellers wafting gently around in contrast to the A.B.C. engine's high-pitched buzz.

For hour after hour the two machines circled, then, just after 3 p.m., Raynham had to land, for lack of oil. His 7 hours 31½ minutes flight created a new, though shortlived, British duration record.

Hawker was still circling steadily. Could he exceed Raynham's time? Minutes ticked by to the 1800 rpm buzz of the A.B.C. Nursing the fuel, Hawker dropped his tail lower and lower as he decreased the revs. A little knot of spectators began to gather around the timekeeper as he counted off the remaining minutes. One more circuit and Raynham's shortlived record would be beaten. Around came the Sopwith machine again, purring steadily, and a sigh from the crowd acknowledged the end of one record and the beginning of a new. Up went Hawker's tail and the machine pulled away on yet another circuit.

Hawker had a flask of cocoa, some chocolate and sandwiches aboard. He was quite cozy in the little streamlined nacelle. There were 32 gallons of fuel in the two tanks, more than enough for the flight as it turned out. Soon it was nearly dark, and Hawker opened the throttle fully and climbed to 1400 ft. The competition regulations stipulated that flying should not continue beyond one hour after dark, and at 5:50 p.m., just before the time limit, Hawker descended to look for the now-hidden landing ground. As he swooped low out of the night, officials on the ground lit gasoline flares in the nick of time to enable him to make a perfect landing, exactly 8 hours and 23 minutes after take-off.

His capture of the British Duration Record and the Michelin Prize immediately brought Hawker into the forefront of British competition and record flying. On May 31, 1913 he took the Sopwith three-seat Tractor biplane (80 hp. Gnome) to 11,450 ft. to gain a new British height record. On June 16th he beat Geoffrey de Havilland's height record of 10,560 ft. with one passenger, reaching 13,400 ft. despite intense cold. The same day, with a brief pause to thaw out, he took off again, this time with two passengers to reach a record 10,800 ft. Finally, on July 27, 1913 he took up three passengers and reached 8400 ft.

Meanwhile, on July 8, Hawker had gained yet another success for Sopwith machines, winning the £500 Mortimer Singer prize for an amphibious aircraft. Six out and back five-mile flights and landings from a point on the land to one out to sea were made on the Sopwith Bat Boat.

Hawker made two unsuccessful bids for the £5000 *Daily Mail* Circuit of Britain competition of 1913. Entrants had to fly with a passenger a 1540-mile circuit of the coast within 72 hours, landing at various control points on the way. Hawker's first try on August 16th ended in his collapse from sunstroke and exhaust fumes shortly after landing at the Yarmouth control.

A second try, starting on August 25, got much nearer success. Starting from Southampton Water, the Sopwith seaplane touched down at the Ramsgate, Yarmouth, Scarborough, Aberdeen, Cromarty and Oban controls, as well as making several unscheduled stops in between for various reasons. The flight ended abruptly near Dublin when Hawker decided to land because of suspected broken valve springs. Spiralling down to the water, his foot (upon which oil had been dripping during the flight) slid off the rudder bar, and the machine immediately sideslipped into the water. Had Hawker only known it, the Green engine's designer was waiting at Dublin with a new set of valve springs. The 1040-mile flight had taken 55¾ hours, or 21 hours, 44 minutes actual flying time. As some sort of consolation, the *Daily Mail* presented £1000 to the Sopwith team.

Between competitions, Hawker was giving valuable assistance with the design and testing of machines like the Bat Boat and the three-seat Tractor. He made a significant contribution, too, to the design of the speedy Sopwith Tabloid, and piloted it on its sensational 90-mph debut at London Aerodrome, Hendon, on November 29, 1913, having that very morning made a 92-mph speed dash at the Royal Aircraft Factory, Farnborough.

A demonstration trip to Australia and

(*Continued on page 50*)

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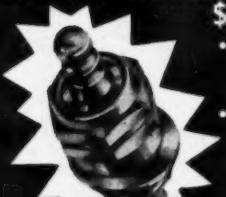

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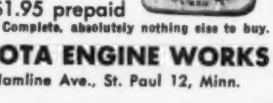

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more competitions and displays after his return to England preceded the Great War, during which Hawker did perhaps his greatest work, as Sopwith chief test pilot. Ill-health had dogged him for years and he was unfit for active service. On August 4, 1914, the day of the British declaration of War on Germany, he delivered his specially modified "looping" demonstrator Tabloid to the "Factory" at Farnborough. Thereafter he took a leading part, as one of the first designer-engineer-test pilots, in the development of the famous Sopwith wartime fighting aircraft. As one aspect of his war work, during July 13, 1914 and October 16, 1916 Hawker tested 295 different aircraft.

With the War and a tremendous wartime reputation behind them, Sopwiths turned with confidence (ill-founded as it turned out) to a civil outlet for their products. One of the new products was a Rolls-Royce Eagle-powered five-passenger cabin Transport. When it was decided to enter a machine for the *Daily Mail* £10,000 competition for the first British-crewed machine to cross the Atlantic non-stop, the Transport design was adapted as a special two-seater machine to be piloted by Hawker for an attempt. Sopwith entered their modified machine, named the *Atlantic*, on March 11, 1919, the machine having taken only six weeks to build. Fuel tanks replaced the original cabin and the open cockpit was arranged with side-by-side, slightly staggered, seating to give maximum ease of movement and communication for the crew.

The motor fitted was the magnificent 360-bhp 12-cylinder Vee water-cooled Rolls-Royce Eagle, revving normally at 1800 rpm and consuming 24 gallons of gasoline per hour at normal power. A two-bladed propeller was fitted later for the actual Atlantic flight.

Critics at the time abhorred the use of a single motor for such a long and hazardous oversea flight. Hawker's rejoinder was that hardly any multi-engined machine of the time could fly with full load with less than all its engines operating. If it lost one engine, then it would have to come down just as would the single-engined *Atlantic*. Also, the single-engined machine had a better height performance to rise above bad weather and navigate by the stars.

The *Atlantic* also featured a droppable landing gear which was to be released soon after take-off to cut down weight (by 4 cwt.) and head resistance. Hawker figured that the risk of a belly landing—for which wooden skids were provided along the fuselage bottom—at the end of the flight would be more than offset by the improved fuel margin and the greater safety factor in an emergency sea landing, when a wheel undercarriage would dig into the water and somersault the machine.

The detachable top decking aft of the cockpit formed a small boat, complete with paddles, flotation bag, rations, flares, and a sea anchor. Rubber flotation suits of U.S. Navy pattern with inflatable air bags back and front were worn by the crew.

Current for the radio (which on the flight proved to be useless) was provided by a wind-driven generator, the propeller of which could be retracted into the fuselage when not in use.

Hawker was to take as navigator Lt. Commander K. Mackenzie Greave. The crated machine, attended by the fliers left England on the *S. S. Digby* on March 20, 1919, bound for Newfoundland. Captain Montague Feen had gone on ahead with a ground party to find a suitable site for a flying field.

It took a week after their arrival at St. Johns on March 28th to assemble the machine in its specially constructed wooden hangar, and then the crew settled down to testing, and to wait for favorable weather reports. Each day the machine was groomed, the engine run up, and the water system carefully filled and finally emptied again to guard against freezing. The detachable boat and the immersion suits were tried out in the nearby lake, and experiments made with various radio installations.

Soon after the arrival, Hawker's old duration-record opponent, Raynham, turned up with the Rolls Falcon-engined Martinsyde Raymor and Captain Morgan as navigator, for their rival attempt. The faster Martinsyde was quickly made ready, and thereafter the two teams watched each other like hawks to guard against a surprise take-off. Days of bad weather went by, and tension mounted to such a pitch that finally the contestants came to a gentlemens' agreement to give due notice of an impending start. Throughout the rest of April and well into May, weather reports were adverse.

Meanwhile, three U.S. Navy flying boats, N.C.1, N.C.3 and N.C.4, had taken off from Rockaway Beach and headed for Trepassey, Newfoundland, on the first stage of a trans-Atlantic air crossing. Hawker saw the likelihood of the honor of the first crossing, though not a non-stop one, falling elsewhere than to Britain. With the N.C. boats on their way to the Azores, he decided to take off at the earliest possible opportunity. A little later, on May 18th, weather reports being reasonable though hardly favorable, Hawker and Grieve decided to make their attempt.

At 3.15 p.m. (5.51 p.m. Greenwich time), with 350 gallons of gasoline aboard, and mail which included a letter from the Governor of Newfoundland to King George V, the *Atlantic* trundled down the slope on its take-off run, barely clearing the ditch and fence at the far end. Climbing away into the sunlight, Hawker glanced down to see Raynham's Martinsyde on the rival landing ground, surrounded by a crowd of people. At 1500 feet he dropped the undercarriage (the airspeed indicator immediately jumped forward seven mph.) and passed over the coast, headed northeast.

Sea fog was encountered almost immediately, but Hawker was soon above this into a clear sky. Grieve had time to get a quick drift reading and the level fog-bank horizon was acceptable for sextant readings.

For the first few hours the sky was bright and clear, the plane cruising at an

(*Continued on page* 52)

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indicated 105 mph at 10,000 ft. But 400 miles out the weather began to close in and they were soon encountering thick haze and an occasional rain squall. An hour later, glancing at the water thermometer, Hawker saw that it read high despite his opening the radiator shutters to their full extent. Obviously there was some obstruction in the cooling system, and he thought back to their careful filling and emptying of the system back at Mount Pearl. Perhaps too much rust had formed during the process and was now clogging the water passages.

Cloud was now thick around and below them, preventing the taking of drift readings. Later they found that they had drifted 15 miles south of their intended course. Water temperature continued to rise, and eventually Hawker decided to try to disperse the obstruction by cutting the motor and diving the machine. The maneuver seemed to be successful for the temperature remained moderate as they climbed back to cruising height, but 60 minutes later, 800 miles and six and a half hours out from Newfoundland, the gauge had again crept up to danger level. Unless something could be done, the 17 gallons of coolant would slowly boil away and precipitate a forced landing in the sea. Further diving was of no avail, and the only remedy was to struggle to 12,000 ft and there cruise on the minimum throttle opening to save the water. The top wing center section was covered with ice formed by the condensing steam, and a plume of vapor streamed back from the radiator vent.

By now the moon was well up, and Grieve got an occasional observation on the stars through gaps in the cloud. For several hours, Hawker managed to keep the coolant below boiling point, but 12 hours out, on the morning after their take-off a solid range of fantastic black cloud peaks fully 15,000 ft. high blocked their way. A long detour could not be risked, and so it was decided to go under the front.

Down they dropped with the motor stopped to lower the water temperature. Quite near the sea, Hawker opened the throttle—and nothing happened. Frantically, Grieve began to pump up fuel to the carburetor, until Hawker slapped him on the head and yelled at him to brace himself for the crash. On the downward swoop, the engine must have become stone cold because of lack of water in the radiator tubes and block passages. Barely ten feet above the wave tops, the motor fired and Hawker banged open the throttle, the engine bellowed, and up they staggered from what would probably have been a watery end, into the eye of the rising sun.

This fright convinced the fliers that they would not reach Ireland, and it was decided to use the last hour or two of the coolant to search for a ship alongside which they could make a landing. For over two hours they flew a zig-zag pattern in worsening weather and fog, searching for a vessel.

The watch of the Danish steamship *Mary*, eastward bound, sighted the machine at about 7 am Greenwich time on the morning of May 19th. Hawker had been almost overhead before he spotted her in the gloom. Circling, he fired off three very light distress signals and then flew off two miles ahead to make a superb landing in heavy seas. The machine floated well but began to break up under the impact of the waves washing over it, and the fliers launched their boat in readiness to abandon ship. As they waited in the waterlogged cockpit, the *Mary* came up, but it was an hour and a half before one of the boats gallantly fought its way 200 yards to the sinking plane against mounting seas. With Hawker and Grieve aboard, the boat was hauled back by line to the *Mary*, but nothing could be salved then from the plane.

Back home in England the drama continued for a week. The *Mary* was without wireless and no word of the fliers reached home. They appeared to have been lost without trace. Obituary notices appeared in the press.

But on Sunday, May 25th, the coastguard station at the Butt of Lewis, Outer Hebrides, wired to H.O. that they had been signaled by a passing Danish vessel. The fliers were safe aboard. The country went wild with relief and enthusiasm, and the progress of Hawker and Grieve from Scotland to London was something of a triumphal procession, ending with an audience with the King and Queen at which they were each presented with the Air Force Cross.

The pair had flown about 1050 miles at an average speed of 80 mph. and had used only half their fuel when they were forced to land. Had the cooling system not become blocked, the probability is that the flight would have been successful, for the motor ran perfectly despite the overheating, and the weather, though threatening, was not impossible.

Raynham and Morgan never got off at

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all. Trying to get away before Hawker gained too much of a lead, Raynham attempted a take-off in an adverse wind, crashing the heavily-laden machine in the process.

The Sopwith team was awarded a magnificent consolation prize of £5000 by the *Daily Mail*, but the main £10,000 prize which both crews had failed to win would not be unclaimed for much longer. For on June 13, 1919 a Vickers Vimy piloted by Captain John Alcock and Lt. Arthur Whitten Brown was waiting ready at St. Johns to take off and head out over the Atlantic.

• • •

Contemporary sources vary slightly as to figures for the *Atlantic*, but Hawker himself gave the following. Span 46′ 6″; overall length 31′ 6″; chord 6′ 3″; gap 6′; cruising speed, using 15 gallons per hour, 105 mph; maximum speed 118 mph; speed at 10,000 ft., 105 mph; ceiling, loaded for Atlantic flight, about 13,000 ft.; maximum economical endurance 31 hours; all up weight 6150 lb.; disposable load 3350 lb.; engines, Rolls-Royce Eagle VIII, 360 bhp. Tail-up height, 11′ 1″; top plane area 280 sq. ft; bottom plane area 255 sq. ft; tailplane span 11′ 4″; propeller diameter 9′ 6″.

• • •

After the Atlantic attempt Hawker turned to automobile and motor boat racing as well as continuing his competition flying. The Sopwith Company became defunct, and the new Hawker concern was still building two-stroke motor cycles when, testing a Nieuport Goshawk entered for the 1921 Aerial Derby, the machine caught fire in midair. Out of control it struck the ground, blew up, killing the pilot instantly.

(Acknowledgements to: The Royal Aeronautical Society; Flight; "H. G. Hawker, Airman" by Muriel Hawker; "Our Atlantic Attempt" by Hawker and Grieve; Hawker Aircraft Ltd for photographs and drawings; *The Aero.*)

The Hand Launched Glider

(*Continued from page* 25)

especially in conjunction with experiments in the design of new airfoils.

About all that can be said of turbulators on hand-launched gliders is that they don't seem to hurt the performance of the glider. Serrated leading edges and strips of tape or thread are most often used to artificially turbulate an airfoil. A very sharp leading edge will give good turbulation and a sharp slat ahead of the leading edge has met with some success as a means of inducing turbulent flow in the airfoil's boundary layer.

Most of the foregoing design improvements have applied to indoor gliders and, with the possible exception of high aspect ratio wings and underslung rudders, are of dubious value when applied to outdoor ing ideas.

gliders. The opposite is true of the follow-

The problem of keeping a glider turning tightly in thermals without spiral diving to the ground is of major importance to contest fliers. Both the high forward fin and the underslung rudder are quite valuable as a means of keeping a tightly turning glider upstairs in gusty weather. Swept-back tip sections on polyhedral wings have also been reported as effecting a cure for spiral instability, about 20° at the leading edge being sufficient for most gliders.

Negative dihedral in the stabilizer (also called anhedral or cathedral) has been widely used as a cure for spiral diving in outdoor gliders. It has the disadvantage of interfering somewhat with the glider's ability to roll out quickly in the transition from climb to glide. One half inch of dihedral is all that should ever be needed on any glider.

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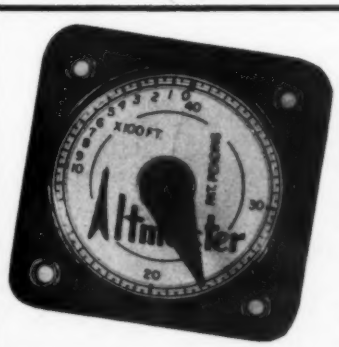

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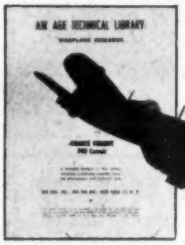

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The practice of tilting a stabilizer to obtain turn in the glide has long been used on gas models, but its use on hand-launched gliders has never been widely accepted. The author has seen gliders with flat, dihedral and cathedral stabilizers tilted for turn and even flat stabilizers with the tip of one panel cut off and cemented on at an angle raising or lowering the tip to give partial tilt. In all cases the results were quite good.

Previously, all discussion has concerned all-balsa gliders with solid wings, but built-up wings are often used, especially on larger outdoor models. The most popular construction methods have been the sparless, or "Ritz" type (figure 4.3) and "Swiss Cheese" hole punching, both using a sheet outline and tissue covering. "Fireball" type construction, all sheet monocoque (figure 4.4) has been successfully used on Nordic Gliders and if lightly built will work well on hand-launched gliders too. Built-up wings do not offer a means of lowering the weight of a glider except in the largest sizes, but they do permit the construction of good gliders when there is no good wood available.

Built-up bodies, usually of box or triangular cross-section, have made rare appearances on both indoor and outdoor gliders, but their large size and unstreamlined shape probably resulted in more loss than gain. Twin booms have been used in many different styles and combinations, but again seem to suffer by being too large or too heavy.

One method of adjusting an outdoor glider for glide turn which has not been mentioned is the drag tab, frequently found on free-flight gas models. These are very effective on hand-launched gliders, being overcome by the high speed of launching and recovering effectiveness as the model slows to gliding speed. Care should be taken to keep the size of the tab to a minimum, avoiding excess drag and critical adjustments.

Unless the modeler enjoys building gliders above all else, a dethermalizer for outdoor gliders will soon suggest itself. Several types are adaptable to hand-launched gliders, the most commonly used being the swinging weight (figure 4.5). This simply entails fastening the balance weight on the end of a string, the other end of which is fastened to the model's tail. The weight is held at the nose during flight by a rubber band which is burned through by a fuse shifting the weight to the tail and stalling the model to earth. Drag flaps and spoilers may also be used to dethermalize your model.

Pop-up stabilizer dethermalizers popular on larger models may prove difficult to adapt to hand-launched gliders due to the necessity of obtaining a rigid stabilizer mounting to withstand the launching stresses. One solution seen recently was hinging the rear ⅜ of the stabilizer with a gauze hinge to the forward part and mounting the forward portion securely to the fuselage. (Fig. 4.6).

Fuses are by far the most popular type of timer for dethermalizers, although small air timers (such as the Elmic timers) have been seen on large gliders.

Many new materials, especially plastics, have made appearances in recent years and some have found their way into the hands of inventive glider builders. Styrofoam has been used for wings, both rough and with a smooth finish. Saran film has been employed over wood and on built-up surfaces to eliminate the need of a doped finish. Aluminum tube bodies have made appearances, but their weight is much too great for efficient use. In all these instances, too little has been done as yet to allow us to draw definite conclusions of the value of

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these new materials in the glider field.

The chart (figure 4.7) shows the dimensions of some of the best indoor gliders of the past decade. This data was picked out of magazines, photos and three view drawings and by actual measurement of the models by Tem Johnson, and represents a considerable amount of sleuthing in this field. The purpose of this chart is to illustrate the wide variety of designs which can give high performance and to determine, if possible, trends which will lead to higher performance. Such trends are not obvious when the dimensions of the gliders alone are studied; it is necessary to consider secondary factors which are calculated to compensate for the differences in the size of the various gliders. These factors are: the Tail Volume Coefficient (T.V.C.), which is a measure of the longitudinal stability of the model; the Scale Effect Factor (K), which is a measure of the aerodynamic relationship between the model's weight and wing area.

Both of these factors show definite trends. Tail Volume Coefficients are increasing, showing that stability, especially in the transition between climb and glide is a definite factor in performance. An effective stabilizer also helps to damp out the oscillations caused by turbulence and separation of the air flow over the wing. If more proof is needed, a look at the amount of dihedral in the top models also shows an increase. Lateral stability in the transition is boosted there.

A decrease in the Scale Effect Factor indicates a trend toward effectively heavier models, an attitude of "throw them higher and the glide won't matter." It isn't that the gliders are getting heavier, but that they are getting smaller. This trend toward "missiles" and away from "floaters," how-

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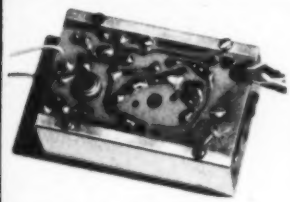

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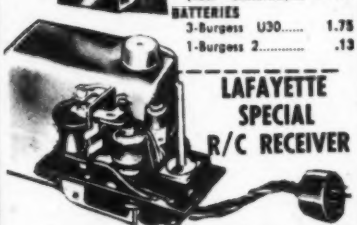

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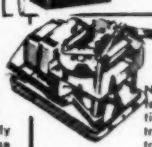

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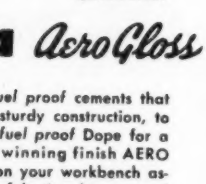

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ever, is offset by a definite increase in Aspect Ratio (A.R.) an attempt to gain back some of the gliding ability which was surrendered to get extra altitude.

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West Germany 1959

(*Continued from page* 11)

cylinder motor formerly used. While the general standard of flying is improving, Stegmaier and Bernhart remain supreme. The latter's Navion-type original is a sheer joy to watch as it does the book. There two fliers often give demonstrations, including formation and combat flying, at large meets.

A very popular branch of R/C flying is the sailplane class, either towline or slope-soared. Models are mostly semi-scale, and rival full-size ships in their grace and beauty, especially when flown at the Wasserkuppe, traditional home of the D. Ae. C. and site of the annual Slope Soaring Nats.

Control-line never seems to have caught on to the same extent as in other countries in Europe. Stunt and combat are most popular, and some excellent young fliers, like Diemer and Rieger, have proved they can match Europe's best in these classes. Team-racing is excellent, smart teamwork and fast starts being common, but German teams have been hampered in International meets by motors that wouldn't take the strain of long races. Speed has only a small following, and scale, though improving, has a long way to go to reach US standards.

Separate Nationals are held for F/F, R/C and C/L, the first naturally being the largest. The F/F contest is held over three days; on the first, the glider events (A/1, A/2 and N/1—Tailless) are usually flown off, followed by Classes W (Wakefield), L (Gas up to 1 cc.), I (Gas from 1.01 to 2.5 cc.), N/2 (Tailless Rubber) and N/3 (Tailless Power) on the second. Fliers may compete only in the classes in which they qualified at the Land Champs. The top dozen in each World Championship Class (W, A/2 and L-I combined) fly off for the championship title and a place on the World Championship team (for the following year) on the third day, the total of both days counting for score. The consistency of flying is remarkable: in 1958 the winners of I and L each turned in 10 maxes!

An American modeler at his first German F/F Nats would notice many differences from the US Nats: the lack of a workshop and feverish last-minute building, since almost without exception the ships are so flown-in they could be unpacked and launched without even a test hop; the high standard of towing in the glider events—the German contests are unique in that there is a two-minute limit on holding the ship on the line; the calm yet rapid starting of the contestants in all the events; the close co-operation between the members of the various Land teams under a manager, especially in retrieving models—the flier himself usually doesn't have to chase; the evening bull-sessions and songs in a local hotel or cafe; and above all the tent-towns along the edge of the field. This last is one of the most enjoyable features of the Nats (in good weather, of course!) but proved disastrous at the last Nationals

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at Saarbruecken, when a 90-knot wind suddenly sprang up without warning during the last round of the first day, wrecking tents and models, and leaving most of the fliers soaking wet. Fortunately, no-one was hurt, and things were soon put to rights again, but many fine models were shattered or lost completely.

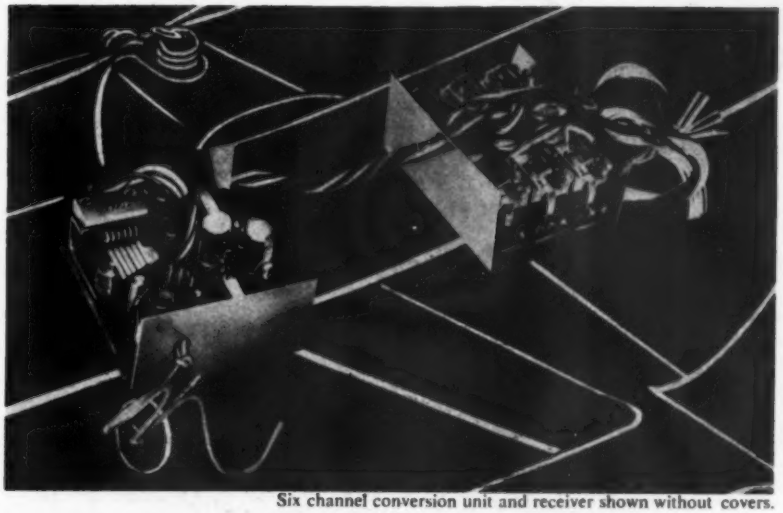
Another refreshing feature of the German Nats is the originality of the models. Kit models are rarely seen, and most fliers do not even use published designs. Construction and finish are often outstanding, many using geodetic construction, planked surfaces (sometimes top and bottom) and/or rolled tube fuselages. Two-piece wings are almost standard, even on the smallest gas model; refinements like timer-operated rudders and folding props are becoming more popular with the power fliers.

This is all the more remarkable when one considers how young the sport is in Germany. Even three years ago, some of the older fliers regarded balsa with suspicion, and many all-hardwood kits are still on the market. In 1956 I was struck by the window displays: kits for prewar designs in ply and hardwood lay beside the latest Webra Mach I's! The situation has improved since then, of course, and now the West German model industry rivals the British in range and quality. Even US products, such as Cox engines, are gradually appearing on the market, while Japanese OS-Max motors have been available for some years now. A new magazine, "Modell," edited by Karl-Heinz Denzin, has recently appeared on the market and promises to be outstanding. Denzin, of course, is probably the most successful kit designer in Germany and is also a top glider flier.

What sort of person is the German flier? By and large, he is the same as modelers in other countries. He will travel miles to fly in a meet where the first prize is a printed certificate. He is invariably friendly and helpful to a newcomer, and is eager to discuss new ideas and learn from others. His knowledge of theory is superior to that of the average US modeler; some have even gone to the extent of attending night school to improve their knowledge of aerodynamics.

The most impressive thing about the German flier, however, is his sportsmanship. One particular experience of mine illustrates this. At a contest near Frankfurt/Main some years ago, I was flying A/1 as my main class and FAI gas for experience. In the third round, the gas job d/t'd into an orchard and knocked off a wing-tip. Returning to the field, I told some fliers I'd met that day for the first time that I would quit the power class although sitting high. One of them who was also in the lead seized my ship, grabbed some cement and pins out of his kit and spent the whole lunch-hour repairing. He refused to return the ship until it was back in shape, and did such a good job that I was able to finish, but a poorly-running motor dropped me down to fourth place. The nice part of the story is that the fellow who helped me won!

I should like to point out one last thing: the reason that German fliers like Lindner and Saemann have been so successful in international meets is not because they have some magical formula or hush-hush aerodynamic data. Their success is due more to sound design and construction, close attention to details, and above all the untiring patience that breeds consistency in good conditions and bad.



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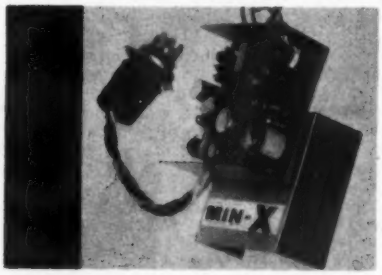

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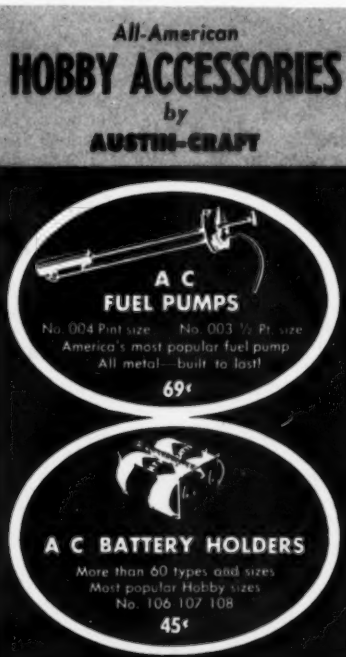

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Foreign Notes

(*Continued from page 2*)

Blizzard .15, but, unlike the reed-valve Blizzard, remain shaft rotary induction engines. Outputs claimed for these motors are .25 hp at 12,000 rpm, for the Rasant, and .092 hp at 11,500 rpm for the Hobby.

Lothar Piesk's international class free-flight model, which is one of the best German free-flight designs yet seen and which performed impressively at last year's World Championships meet, has now been kitted by Graupner under the name of Atlas. Originally powered by a Taifun Hurrikan motor, it is intended for .09's and spans 51 in. The model features a low pylon configuration with fully cowled motor. Like most recent Graupner kits, plan instructions are printed in English as well as German.

RUSSIA

We have a report from the USSR that Michael Vasilchenko, well-known Russian U-control expert and speed flier, has set a new national record of 232.257 km/hr (144.3 mph) in FAI Class I speed (.15 cu. in.). This is 10 mph better than the previous Russian record and only two mph below the present world record held by Czechoslovakia's Josef Sladky. Type of motor used was not disclosed.

SOUTH AFRICA

Making helpful suggestions for the benefit of those attending the '59 S.A. Nationals, WIPMAC, bright and breezy bulletin of the Western Province Model Aircraft Club, prints a 15-point Check List for contestants: props, fuel, cement, screwdrivers, etc., followed by a Swank List ("what you don't need but may see") to wit: two spare motors per plane, all specially tuned; 6-volt electric drill for winding rubber; six boosters hooked in parallel; trolley for same; moped motor for trolley; custom-made portable workshop; trolley for same, attached to booster trolley; card-index system for pin-pointing wanted tools; change of hats, one for each day; portable radar flyaway locator; Piper Cub for which to operate radar; mounted price-list showing colossal cost of super RC model (untested); four gold-plated stanchions and length of velvet rope for protecting models from spectators.

BELGIUM

Celebrating its first birthday is *Model Avia*, Belgium's only model magazine, and journal of the *Federation de la Petite Aviation Belge* (model section of the Belgian Aero Club). Modestly, the editor tells us that he and his small staff are but "amateurs", and that they are lucky to have survived a full year, but we must remark that, in spite of its few pages (24 plus covers) *Model Avia* is, in fact, a far more 'professional looking' magazine than the majority of model publications printed outside the U.S.A. and Great Britain. Printed on good quality art paper, with nice presentation, good articles, photos and drawings, *Model Avia* deserves to succeed and we hope it will. Good magazines do much to sustain interest in model building.

ICELAND

To Capt. W. E. Smith and S/Sgt. J. J. Tomlinson, USAF, late of Keflavik Airport, the Model Club of Reykjavik, Iceland, send best wishes and "a thousand thanks" for past help.

Bjorn Ingimarsson, who sent this message, tells us that the Reykjavik club, which has 30 members, was formed in November '57 and is the only model club in Iceland. Two clubs have previously existed, one founded in 1939 and another in the late forties, but neither survived for very long.

1959 AIR YOUTH
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at
Los Alamitos Naval Air Station,
Los Alamitos, California
JULY 27 through AUGUST 2, 1959

Through the sponsorship of the Hobby Industry Association of America, 50 Airline Trips to this year's National air-model competition in California have been established! State Champions under 21 years of age (as of July 1, 1959) will be certified by the ACADEMY OF MODEL AERONAUTICS, Washington, D.C. Current plans call for the selection of these outstanding flyers on the basis of contest performance in forthcoming, officially sanctioned State Championship Meets. (In those States where time does not permit the organizing of a State Meet, selection will be made by the AMA from past contest performances.)

HERE'S WHAT TO DO. . . RIGHT NOW!
Fill out the attached form and mail it to: HOBBY INDUSTRY ASSOCIATION OF AMERICA, INC.
This will go to the sponsoring group which will conduct your AIR YOUTH State Championship Meet (or to the AMA if selection is made on a past performance basis). Listings of AIR YOUTH — HIAA State Championship Contests will be available through hobby dealers, model magazines and the Academy of Model Aeronautics, 1025 Connecticut Avenue, Washington, D.C.

(TEAR OFF AND RETURN)

Hobby Industry Association of America, Inc.
Room 1600 — 1528 Walnut Street
Philadelphia 2, Penna.

I would like to participate in the HIAA—AIR YOUTH STATE CHAMPIONSHIP designation for my State.

NAME (type) _____

Address: _____

CITY: _____ **STATE:** ____

My age as of July 1, 1959 is:

My Hobby Dealer is:

_____

Address: _____

1. ☐ **I have not competed in Model Airplane Contests**
2. ☐ **I have competed in Model Airplane Contests**

If No. 2 is checked — accompany this with a list of last two contests entered, place, approximate dates and places won, if any.

due, it is thought, to insufficient emphasis on contest flying. For this reason the new club is, this summer, running three events, Clipper Cargo, AMA team racing and FAI towliner, by which means it is hoped to increase interest and attract more members.

In October, Bjorn Ingimarsson is coming to the U.S. to attend the Northrop Aeronautical Institute at Inglewood, Cal. If any Inglewood enthusiasts would like to contact Bjorn (Langavegur 143, Reykjavik, Iceland) he would like to correspond, pending a meeting later.

IN BRIEF . . .

England . . . Dartford (London) club members are hoping to raise the unofficial world record mark for control-line duration. Scheme is to fly indoors and to control the model from outside the circle, using the special pylon and control-stick equipment devised by *Model Aircraft* magazine for last year's Model Aircraft Exhibition in London.

S. Africa . . . Rumor has it that an oil company is to make a film of model flying activities in South Africa. Film will, it is said, be 16 mm. sound, color. Uncommon hazard which confronts modelers in some parts of the Union is poisonous snakes. A supply of serum is maintained at the clubhouse of the Cape Province Flying and Gliding Club at Fisante, where many C.P. modelers fly.

Poland . . . Somewhat unexpected item to find in an East European magazine, Polish *Modelarz* recently ran a two issue feature on building a catapult launched model of the U.S. Army's Chrysler Redstone rocket.

Navy Bellanca

(*Continued from page* 12)

Mono-line mechanism should be firmly attached to the ¼" plywood sheet using the hardwood wedges furnished with the Stuntmaster unit. Insert this into the fuselage and cement it well to the sheet balsa braces as shown. Use plenty of cement and be certain that the Mono-line unit is at the correct angle. Add the control rod.

Engine mounts and fuel tank are installed at this time. The experienced stunt flier will undoubtedly install his favorite tank; however, the tank shown performed in a most satisfactory manner in the prototype model.

Bend the wire landing gear to shape and firmly bind the joints with thin copper wire and solder very thoroughly. Attach the landing gear to the support with strong thread and cement. The entire landing gear assembly is now securely cemented to the fuselage and bulkheads.

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1/16x3/16	4/5¢	3/16x3/8	6¢	1/4x1/2	8¢	3/8x3/4	15¢
1/16x1/4	3/5¢	3/16x1/2	8¢	1/4x3/4	12¢	3/8x1	25¢
1/16x3/8	2/5¢	3/16x3/4	12¢	1/4x1	20¢	3/8x1½	35¢
1/16x1/2	3¢	3/16x1	20¢	1/4x1½	30¢	3/8x2	45¢
1/16x3/4	4¢	3/16x1½	30¢	1/4x2	40¢	3/8x3	70¢
1/16x1	5¢	3/16x2	40¢	1/4x3	60¢	3/8x4	90¢
3/32x3/32	4/5¢	3/16x3	60¢	1/4x4	80¢		
3/32x3/16	3/5¢	3/16x4	80¢				
3/32x1/4	2/5¢						
3/32x3/8	3¢						
3/32x1/2	4¢						
3/32x3/4	4¢						
3/32x1	6¢						

SHEETS 36" Lengths

1/32x2	10¢	1/16x2	10¢	3/32x2	12¢	1/8 x2	15¢
1/16x2	10¢	3/32x3	18¢	1/8x2	25¢	1/8 x3	40¢
3/32x2	12¢	1/16x3	16¢	1/8x3	40¢	1/8 x4	50¢
1/8 x2	15¢	1/16x4	25¢	1/8x4	50¢	1/8 x6	60¢
3/16x2	18¢	3/32x4	25¢	1/4x2	20¢	1/4 x3	30¢
1/4 x2	20¢	1/4x3	30¢	1/4x4	40¢	1/4 x4	40¢
3/8 x2	25¢	1/4x4	40¢	1/4x6	60¢	1/4 x6	60¢
1/32x4	25¢	3/16x3	25¢	3/8x3	60¢	3/8 x4	80¢
1/16x4	25¢	3/32x4	25¢	3/8x4	80¢	3/8 x6	1.20
1/8 x4	30¢	1/8 x4	30¢	1/2x3	60¢	1/2 x3	60¢
3/16x4	35¢	1/4 x4	40¢	1/2x4	80¢	1/2 x4	80¢
1/4 x4	40¢	1/4 x6	60¢	1/2x6	1.20	1/2 x6	1.20
3/8 x4	50¢	1/8 x6	50¢	3/4x3	80¢	3/4 x3	80¢
1/32x6	50¢	3/32x6	50¢	3/4x4	1.05	3/4 x4	1.05
1/16x6	50¢	1/8 x8	60¢	3/4x6	1.60	3/4 x6	1.60
3/16x6	65¢	1/4 x8	1.10	1x3	1.00	1 x3	1.00
1/4 x6	70¢	1/8 x8	1.35	1x4	1.30	1 x4	1.30
3/8 x6	90¢			1x6	2.00	1 x6	2.00
1/2 x6	1.10			1x8	2.60	1 x8	2.60
3/4 x6	1.60			1½x3	1.00	1½x3	1.00
1 x6	2.00			1½x4	1.65	1½x4	1.65
1½x6	2.45			1½x6	2.45	1½x6	2.45
2 x6	2.80			2 x6	2.80	2 x6	2.80
3 x6	4.30			2 x8	3.60	2 x8	3.60
1/32x8	60¢			3 x8	5.40	3 x8	5.40
1/16x8	65¢						
1/8 x8	1.10						
1/4 x8	1.35						
3/8 x8	90¢						
1/2x8	1.10						
3/4x8	1.60						
1x8	2.00						
1½x8	2.45						
2 x8	2.80						
3 x8	4.30						

PLANKS 36" Lengths

1 x1	40¢	1/2x2	30¢	3/4x2	45¢	1 x2	80¢
1½x2	80¢	1/2x3	45¢	3/4x3	70¢	1 x3	1.00
1½x3	1.25	1/2x4	60¢	3/4x4	1.00	1 x4	1.30
2 x3	1.44	1/2x6	1.10	3/4x6	1.60	1 x6	2.00
3 x3	2.16	1/2x8	1.45	3/4x8	2.05	1 x8	2.55
1½x3	1.60	1/2x12	2.20	3/4x12	3.20	1 x12	3.90
1½x4	1.92	1/2x24	4.20	3/4x24	6.00		
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3 x4	4.32						
1½x6	2.88						
2 x6	3.84						
3 x6	5.80						
1½x8	3.20						
2 x8	4.30						
3 x8	5.90						

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1/8 x1/4	4¢	1/8 x1/16	2¢	1/8 x1/8	3¢	1/8 x1/4	5¢
1/8 x1/2	7¢	1/4 x1/16	3¢	1/4 x1/8	5¢	1/4 x1/4	8¢
3/16x1/2	10¢	3/16x1/4	8¢	3/16x1/8	5¢	3/16x3/16	6¢
1/4 x1/2	12¢	1/4 x3/4	15¢	1/4 x1/4	10¢	1/4 x3/16	8¢
5/16x5/16	9¢	5/16x1/2	15¢	5/16x1/4	12¢	5/16x3/16	10¢
3/8 x3/8	12¢	3/8 x1/2	16¢	3/8 x1/4	15¢	3/8 x3/16	12¢
1/2 x1/2	16¢	1/2 x3/4	25¢	1/2 x1/4	18¢	1/2 x3/16	16¢
5/8 x5/8	25¢	5/8 x3/4	30¢	5/8 x1/4	22¢	5/8 x3/16	20¢
3/4 x3/4	30¢	3/4 x1/4	25¢	3/4 x3/16	22¢	1 x1/4	30¢
1 x1/2	30¢	1 x3/4	60¢	1 x1	80¢		

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1/8 x3/4 x48	20¢	1/8 x3/4 x36	16¢
3/16x3/16x48	7¢	3/16x3/16x36	6¢
1/4 x1/4 x48	12¢	1/4 x1/4 x36	10¢
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PLAN OF THE MONTH

60. BELLANCA: Scale U/C, .19-.29
HALF ALPHA: FF, .049
DUNWOODY GLIDERS
Gliders (4) from Dunwoody series of articles.

4. SURE FUN: UC Sport, .29-.35
PROFILE SILVAIRE: FF Profile, ½A.
ZEPHYR: Rubber, Fuselage
Control line on floats. Sport Gassie.

9. AEROCOM'DER: Scale, U/C, 2 .15.
MARS: Bob Palmer stunt, .29-35.
NOBLER: Aldrich's Nats Winner, Stunt, .29-.35. **Palmer and Aldrich, plus a twin ukie. Imagine!**

10. SMOG HOG: Bonner's Multi RC, .19-.35.
STRATOLINER: 2 Half A, U/C.
GUARDIAN: U/C Scale, .29 up.
Greatest Multi RC of all time—a beauty!

11. GAMBLER: Mirror Stunt Winner, .29-.35.
DOUGLAS B-66: ducted fan FF, .049.
B-66, the ducted fan job that beats all others.

12. WHIRLING WINGS: Sikorsky XH-5, .15, 'copter.
BREEZY: Small field RC, .049.
SPITFIRE: Stunt, semi-scale, .29-.35.
P. Schoenky, 'copter master-his Sikorsky!

13. T-CRAFT: FF scale, .049.
FENO: Combat, stunt, .29-35.
PADDY'S WAGON: Contest FF, .049.
Paddy's Wagon—one contest job ok for beginner.

14. HEATH PARASOL: RC, FF, Scale, .075 .09.
GUARDIAN: Nats carrier winner, .29's.
SHARPIE: FF Sport, .02-.049.
—Guardian a dilly.

15. RE-8: WW1, U/C. .29-.35.
FLAPPING WINGS: Rubber, ornithopter.
BOOMER: FF, sport, pusher, .049.
Can planes fly like birds? Ornithopter sure does.

22. MOONEY MITE: ½A Scale FF.
'55 RAMBLER: .29 Team Racer.
WACO CABIN: ½A FF Scale
The Mite, stable, real looking low winger. Rambler still beats 'em. Waco—Cute!

43. EQUALIZER: .15 to .19 multi, RC.
QUICKIE TRAINER: Speed, .29.
AMAZOOM: FF, contest, .15.
deBolt's best, the Equalizer? Amazoom—Stan Hill's hi-thrust.

44. CONVAIR'S DELTA: Jetex FF.
LIL DYNAMITE: .15 stunt, UC.
SWAT: ½A, FF, contest.
A trio of exceptional planes.

45. ASTRO-HOG: Multi RC, .29-.35
MITCHELL: Profile, .09's, .15's UC.
Dunn's low wing radio—tops! Nothing matches this multi. The Mitchell a fine flier.

46. PROPJET B-47D: U/C, .15's.
RUFFY: Stunt, .29-.35.
NOR'EAST'ER: Nordic glider.
B-47D, beaut of a project Ruffy: big winner—it's now!

47. FOKKER E-3: 1/2A, FF, Scale.
NAVY RACER: Rubber, semi-scale.
WOODY: .29-.35, UC Combat. Hot!
E-3, beautiful model, fine flier.

48. SPORTCOUPE: .09, U/C, Stunt.
WHATIZIT: .35, Combat, Wooten.
SWIF-F-FT: Jetex, two sizes!
Whatizit, settles fuse-wing debate!

49. CONQUISTADOR: .29-.35, U/C Stunt.
TWO-STAGE ROCKET: Jetex (2).
Stunter is a thing of beauty, and it flies as well as it looks!

50. DUMBO: PBY Scale, U/C, .19's.
FRENCH OLDTIMER: 1914, ½A, FF.
Dumbo, the Catalina, man-sized ukie, takes off, lands on water or ground.

52. GAUCHO: RC Stunt, .29-.35.
THE CHAMP: Best U.S. Wakefield.
LAIRD SOLUTION: U/C Scale, .15-.23.
Gaucho, Argentine Champ, does pattern inverted. Champ, a single Wakefield!

53. SNAP: Sport U/C, .19-.23.
PELICAN: PAA Cargo, .049.
WINDMILL: FF, 'giro, .02-.049.
For proto take-off and landing realistic Snap tops 'em all. Other two, collector's items.

54. SATELLITE: Hunter's FF, .19-.35.
SUPERMARINE S-6B: U/C Scale, .09-.15. **Satellite is top contest free flight '58-'59. Schneider racer, S-6B seaplane is one of FAST club's best projects.**

55. DETROIT STUNTER: U/C .29-.35.
HORNET MOTH: FF, Scale, .02-.049.
THE BARDON: Wakefield.
D'troit St.: McDonald's Strathmoor, Nats favorite. Bardon: Canadian and US Nats winner, tops in rubber.

56. RYAN PT-22: U/C, .19-.25.
SNIPE: Gurnett's Nordic.
Lovely scale job, that PT, with workable flaps, throttle. Tow-line glider long, strong wing, right sections, etc.

57. Twin Lizzie: 1/2A FF.
Com-Bat: U/C, .29-.35.
Fireboat: Marine, RC.
T-Liz, a cute sport job. The boat, Musciano, a beaut.

58. SE-5: FF, .09-.15
PIED PIPER: Rat Race, UC.
½ WAVE: RC, .049
SE-5 most beautiful flying scale model ever published.

59. GASSER: Willard RC, .09
1958 WAKEFIELD WINNER
SKY LANCER: Team, Proto, .29
Gasser, hot pylon racer. Both the others beauties, too.

PLAN SETS 50c p.p. NO STAMPS PLEASE

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Enclosed is _____ for plan sets numbered in boxes below

PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #

Please print your number DISTINCTLY in box for each plan you desire.

PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #	PLAN SET #

List additional plan orders on separate sheet.

NAME PLEASE PRINT

ADDRESS

Limited Supply of Plans Listed Below. Order Early! Check Correct Number on Coupon.

24. Aero Bat, Snoopy, Seagull
26. Corsair, Gyro-Glider, Santanita
29. Cougar, '55 Nordic Winner, Dizzy Boy
30. Great Lakes Trainer, Triple Threat RC
34. Corben Super Ace, Cessna 310, Profile Lightning

Cover the fuselage top and bottom with sheet balsa with the grain running spanwise for greater strength. Add the cabin and nose blocks after they have been roughly cut to shape. When dry, complete the carving of the blocks. Sand smooth and remove the nose blocks carefully. Hollow as the plans indicate and recement in place. Sandpaper the entire fuselage now.

Cut the tail surfaces to shape, sand well, and cement to the fuselage, being sure to connect the control rod to the control horn.

The wing is light but rugged and can use the scale or stunt airfoil, as desired. Slip the ribs onto the main spar. Use plenty of cement and hold the ribs in place with pins until dry. Follow this by adding the auxiliary spars, and leading at this time. Brush the sealer very liberally onto the wood and sand only when it is thoroughly dry. A minimum of eight coats will be required to seal the balsa, but do not hesitate to apply additional coats to thoroughly seal the wood. Sand thoroughly after each coat is dry.

Add the control-line guide to the wing and apply more clear dope to the wing until a total of at least ten coats has been applied. Thin the last three coats with about 10-percent thinner.

The cowl is made from rings cut from sheet balsa and cemented together. Carve and sand gently and apply filler until grain is sealed. After a final sanding, the model can be painted as noted on the plans. Paint the dummy cylinders black and cement in place as shown. Add the cowl.

BELLANCA LIST OF MATERIAL

NO. REQD.	MATERIAL	SIZE	USE
5	medium	3/16 x 3 x 36	fuselage sides, top and bottom
2	hard	1/4 x 3/4 x 36	wing main spar
1	soft	3/8 x 3 x 36	tail surfaces, wing tips
4	hard	1/8 x 1/4 x 36	wing auxiliary spar
1	hard	1/4 x 3 x 36	fuselage formers, cowl
4	medium	1/16 x 3 x 36	wing leading edge covering
2	hard	1/2 x 1/2 x 36	wing leading edge
2	medium	3/8 x 1 x 36	wing trailing edge
3	hard	1/8 x 3 x 36	wing ribs
1	plywood	1/8 x 6 x 12	wing spar joiner, Mono-line control foundation, bulkhead, landing gear support
2	hardwood	3/8 x 5/8 x 8	engine mounts
1	medium	2 x 4 x 18	nose block, cabin front

MISCELLANEOUS

Eight ounces Aero Gloss Clear dope; eight ounces Aero Gloss Balsa Filler coat; four ounces Aero Gloss Silvaire Aluminum dope; four ounces Aero Gloss Cub Yellow dope; one ounce Aero Gloss Cub Orange dope; one ounce Aero Gloss Jet Black dope; Red, White, Blue and Black "Wondur-Cal" fuel proof decals; thread; cement; straight pins; Mono-line control unit; Veco control horn.

Note: Add one ounce of orange dope to the yellow to make it chrome yellow for the top of the wing.

and trailing edges. Cover the center section and leading portion of the wing with sheet balsa. The solid balsa tips complete the wing structure. When the cement is dry, the entire wing structure must be well sanded. The entire wing, including the balsa covered leading edge and tips, should be covered with silk. Use heavy dope, thin cement, or a combination of the two as the adhesive when covering with silk. Before the wing is attached to the fuselage it should receive at least five coats of clear fuel-proof dope.

Cement the wing into the slot in the fuselage. When dry, the wing can be given five more coats of clear dope. A gentle sanding here and there will eliminate any roughness. Use very fine finishing paper or very smoothly worn sandpaper.

The fuselage and tail surfaces are sealed

All insignia, lettering and cabin windows were cut from sheets of "Wondur-Cal" decal. This is fuelproof, adheres tenaciously, and requires no protective coating.

The struts are not removable on the prototype model and no difficulty was experienced during operation. The XRE-1 aircraft were often used for experimental purposes such as automatic course plotting, because of its ability to lift heavy loads and the inherent stability of the design. Plans and the photograph of the full-size plane illustrate a massive radio mast and complex rigging used during the testing of a German automatic course plotter. This is entirely optional and is shown for those modelers interested in the unusual. It is suggested that this rigging be eliminated on the stunt version.

Carefully cut off the cowl with a sharp

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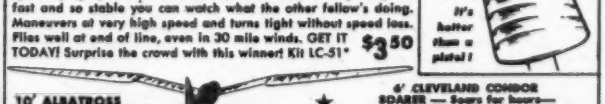

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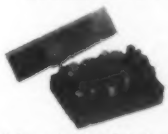

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razor blade and thoroughly paint the cowl interior and engine mounts with several coats of fuel-proof dope. Install the engine now and replace the cowl after cutting openings for the engine cylinder, etc.

Be certain that the model balances as indicated on the plans. The addition of lead weight in the extreme nose or tail, securely fastened, will remedy any unbalanced condition.

Mono-line control lines are available with the ends made up ready for flying. It is suggested that sport fliers use .020" diameter wire and experienced stunt fliers use .028" diameter wire for extra sensitivity. The most attractive feature of Mono-line flying is the ability of flying on extra-long lines without worrying about slack wire and loss of control. Mono-line affords complete control even with a slack line. Line lengths from 50 to 100 feet can be used on this model with absolute safety. After a few test flights, and the model characteristics become known to the flier, there is no reason why 150 foot lines cannot be used following the line diameters recommended by the manufacturer. This is real control line flying!
(Editor—Beware of power wires when flying on such long lines.)

MAN at Work

(*Continued from page 4*)

everything takes from three to five months to come from the states.

"I got a kick out of MAN at Work and your club history. Made me homesick to get back to the states to build some models."

The Reverend Stan Best went down from Los Angeles in 1951. Manaus has a population of about 150,000 but not more than ten guys build models. Hoping to start a club, our sky pilot brought along a few motors and a few accessories. But the main religion is soccer-football and, when Brazil won the world championship in 1958—well, that's all anyone is willing to talk about. Ironically, the Brazilian stamp says Santos DuMont "father of aviation."

• • •

► The Air Youth State Championships promotion is snowballing. For years having listened to much talk-talk with no follow-through, MAN at Work is having a tough time adapting to this new drive, efficiency, and we-can-do-it spirit of accomplishment. We modelers can never know what goes on behind the scenes, but rest assured that HIAA and AMA both have swung a mighty big job in very little time. If this program is continued in the future, the possibilities are simply tremendous. There will be rough spots this year, no doubt, but a growing efficient system of nationwide eliminations in future years cannot fail to boost the hobby—the builders, the manufacturers, the dealers, the magazines, everybody.

• • •

► For plans of all Cessna airplanes, write News Bureau, Attention: Bill Robinson, Cessna Aircraft Co., Wichita, Kan. Have a 12-page booklet, magazine size, containing pictures and dimensioned three-views and cross sections, plus specs and performance figures . . . Numerous scale plans available from Harleyford Publications, Letchworth, Herts, England. Lists over 380 1/72 scale plans, various nations, 1914 to 1946. Also have plan packs, according to type and period. Send for catalogue . . . Roy Cox says Mini-Cargo people can shut off .02 instantly by cutting air—one fellow used rubber tubing through firewall to air intake, pinched by timer . . . 80-page catalogue from AHC (25c)

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For .15 to .35 Engines
3" Scale — 48" Wingspan Pylon Racer

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BIG 1½" SCALE — 54" WINGSPAN
.09 to .19 ENGINES
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The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about.

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For .23 to .65 Engines

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NAVION "Super 260"
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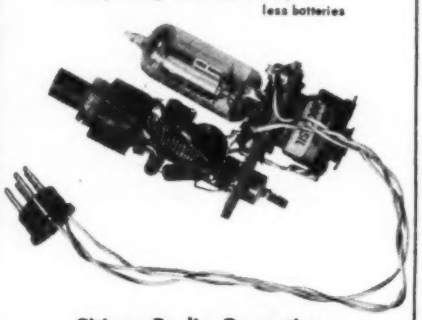

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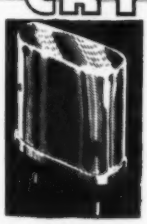

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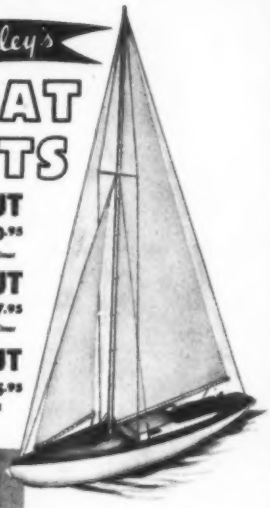
• • •

► Blanchard's FAI Americano looks good to Bill Park (West Germany 1959) who considers the lines beautiful and the construction excellent. Sheet planking of wings the trend over there, in some cases top and bottom both. Reminded of a Bill Poythress story about Blanchard. Bill told Woody about RC and, coming home from work one night, Bill sees this tiny job tearing around above the development. 'Twas Blanchard, of course, landing in his back yard. Can't tell what these "beginners" might do . . . hear tell of some Air Force lads in Japan who scaled up a magazine plan, took it to a kit maker, who made three kits for $7 each . . . 12-year-old Bob Hammel, right here in New York, bought some old magazines and congratulates Chief Many-Irons-in-Fire Willard on his article Free Flight vs. Control Line. If this rhymes with Battleship Maine, it was published in 1947, when Bob was zero years old. Anyway, Bob went into a hobby shop to buy a plastic model and a ready-to-go Jetex and had 35c left over. For his change, the dealer talked him into a 29c Comet P-51 Mustang. And that's how I got started, states Bob Hammel. So kids do graduate from plastics! But the dealer has to be on his toes. What about the last 6c, Mr. Dealer?

• • •

► Letecky Modelar apparently has a potent editorial concerning we'uns. Can't read it, unfortunately, but MAN at Work's name is all over the place, plus an intriguing cartoon showing a U.S. modeler in a sedan chair with two helpers on the handles. On the roof is a model. On the door it says Sport Model (we think). Do you suppose we are too lazy to retrieve our models? MAN at Work is for sure. Seems to us that Larry Conover once wrote an article (unpublished) about a fantastic chase of a free flight that went on for days and days, over the hill and fen. Even swam the Mississippi. Or did he use a boat? Anyway, nobody carried him. Then there was Eddie Mahler and Norm Rosenstock who made a surprise visit one day. How come, we asked? Oh, there's a contest in the next county and Mahler's Civy Boy came down behind your house. They used a car so no score. Have any of you guys been chased by a Black Angus—and we don't mean the grill? And the time your Uncle Willie got lost in the woods looking for a lost model. Rescued in the twilight. Leon Shulman's helper, up one side of a moving freight train, down the other, to save the ship for a Nats-winning third flight. Chasing is fun. But you guys do it!

Berkeley's
BOAT KITS



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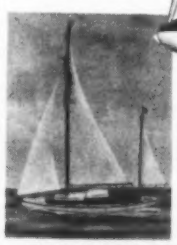
• Weighted Metal Keel



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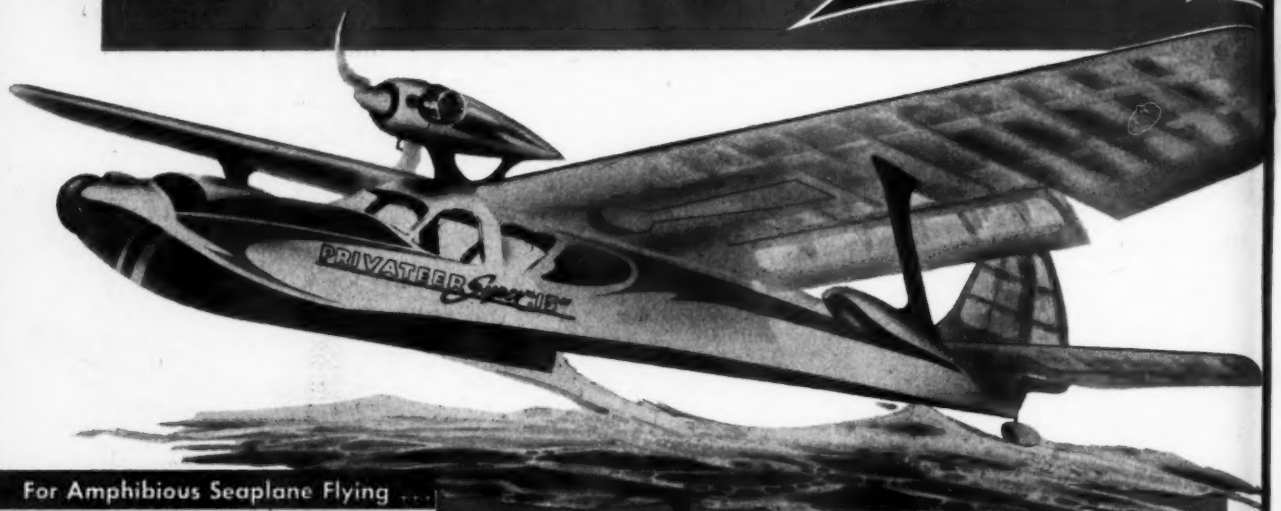

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Watertight R.C. Installation

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60" Wingspan

$6.95

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Fly it on Ponds – Rivers – Bays – Lakes or Flying Fiel

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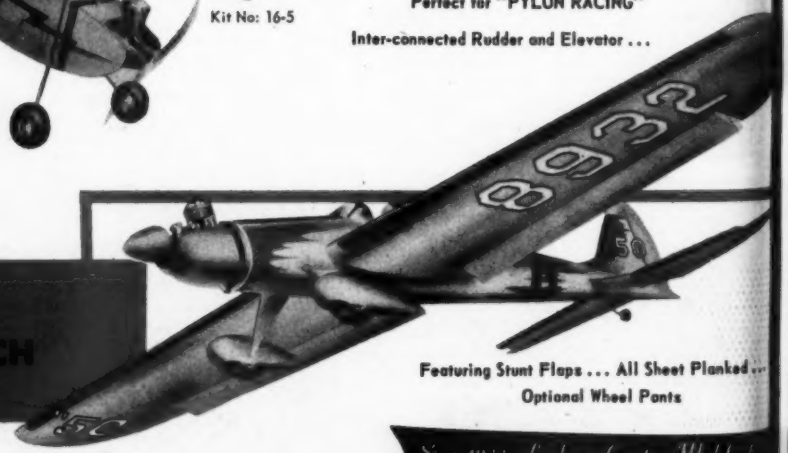

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For. 29 to .49 Engines - 50" Wingspan

$6.95

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